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THE BRITISH ASSOCIATION.

TENTH MEETING: GLASGOW.

[Fourth notice.]

SATURDAY.

SECTION A.—*Mathematics and Physics. Papers and Communications.*

1. Sir David Brewster, 'On the Decomposition of Glass.'
2. Sir David Brewster, 'On the Phenomena of Polarisation as exhibited in Decomposed Glass.'
3. Professor Phillips, 'On Rain Experiments.'
4. Professor Forbes, 'On Cases of Excessive Rain.'
5. Mr. Espy, 'On Storms.'

PROFESSOR Forbes in the chair.—Sir David Brewster read his interesting paper 'On the Decomposition of Glass.' He had formerly brought the subject before the Association; and since that time he had got two specimens of glass—one from Italy, and the other from St. Andrew's, of which the character had been entirely changed by decomposition. Sir David then described the mode of decomposition. It began at certain points, and extended over the surface, either in planes or in concentric films, affording colours of surpassing beauty. In one of the specimens, the silicious portions had separated from the metallic, and had arranged themselves in alternate circles around the first point of decomposition. This liability to decomposition Sir D. feared might produce serious results to science, as some of the finest glasses of scientific instruments were exhibiting symptoms of decay. Sir D. Brewster then described several curious effects produced by the polarisation of light by decomposed glass.

Professor Phillips gave an account of a number of experiments made by him on the subject of rain-gauges. To determine the difference between gauges at higher and lower altitudes, he placed one gauge on the ground, and completely exposed others at heights of three, six, and twelve feet; and after a trial of four months, he had found the results to be in the following proportions:—the highest, 8·206; the next, 8·249; the next, 8·314; and the lowest, 8·408; thus shewing the greatest quantity of rain to have fallen nearest the ground. In order to determine the effect of rain falling at an angle, he had constructed a gauge with a central, horizontal, and four vertical funnels, exposed to the cardinal points, which might lead to some practical result.

The Chairman considered the increase of rain near the ground to arise from the enlargement of the rain-drop by condensation from the heated air of the earth's surface.

After some observations by Mr. Thom, of Rothesay, the Chairman recommended all who had made observations on this subject to communicate them to Professor Phillips.

Professor Forbes made a few remarks on the subject of excessive rains, occasioned by his former statements on the subject having been questioned. He mentioned a number of instances, and referred to various authorities, among which he mentioned a fall of 30 inches of rain in 24 hours at Genoa; and falls at various other places of 25 inches in 24 hours; 14½ inches in 18 hours; 6 inches in 3 hours; four-fifths of an inch in half an hour; 24 feet in one year; 10 inches in 23 hours; 25 feet in one year, of which ten feet fell in June. Mr. Espy said, if they looked into Silliman's "Journal" they would find other cases equally astonishing, such as 10 inches in half an hour, and 15 inches in 3½ hours.

Mr. Espy then began his paper 'On the Theory of Storms,' which occupied nearly two hours. His theory was, that during storms the wind blew from all sides towards a centre, whether the centre of a circle or a square. He went into a great many instances of storms which had happened at particular seasons, and from facts ascertained as to the direction of the winds at various places around the space in which the storm prevailed, he shewed that the facts confirmed his theory. For instance, from the storm on the 6th January, 1839, he had prepared on the map an illustration of his theory. The storm began at Liverpool from ten to eleven o'clock P.M. on that evening, and he had written to various places to ascertain the direction of the wind between ten and twelve o'clock P.M. At the north-west of Scotland, near Cape Wrath, the wind was N.W. and it was the same all over the west of Scotland. In Ireland, at the same hours, it was W. and S.W. In the south-west of England it was S.W. On the south-east of England, at the same hours, S.S.E.; and in some places direct S.E.; at Birmingham, a little E. of S.; at Leeds and Manchester, S. of E.; at Liverpool at ten, S.S.E.; and before twelve, S.W. nearly. Thus were a line drawn from the north-east of Scotland to the south-west of Ireland, on one side of the line the wind would be found to have blown from the N.W. and on the other from the S.E. Mr. Espy then referred to other storms here, in the West Indies, and in America, which went to prove the same theory. The principles upon which it is founded are nearly the following:—The equilibrium of the air may become unstable by the heat or the moisture below. Ascending columns or currents of air are thus formed, which, as they ascend, are subject to less pressure and expand. This expansion produces 1½° of cold for every hundred yards of ascent, while the dew-point falls only ½° for the same space. Clouds will begin to be formed when the column of air rises, as many hundreds of yards as the dew-point is below the air in degrees. When the vapour condenses it will give out the latent caloric into the air, which will prevent the ascending air from cooling more than half as much as it would otherwise have done on its farther ascent. Thus, the higher the column of air rises, the warmer it will be when compared with the air on the outside of the cloud at the same height. For every degree that the cloud is warmer, it will be a certain amount lighter than air at zero, and thus under the cloud the barometer will fall, and the air will run in under the cloud and upwards, with a velocity of upwards of 240 feet per second. After a long account of his theory of the formation of clouds, Mr. Espy gave a description of the effects of the tornado, which he held to be additional evidence in favour of his theory.

Sir D. Brewster stated that he had received a letter from Colonel Reid, from which it appeared that five water-spouts had been examined carefully with the telescope, in all of which it appeared that there was a revolution of the particles of water in the manner of the hands of a watch, from left to right, and that in the midst of such contradictory statements of facts it appeared difficult to settle the question without further examination.

Professor Phillips, in answer to Sir David Brewster, said, he did not conceive that any appearance exhibited by a water-spout could invalidate the conclusive evidence that was to be found of a direct inward motion to a centre, in the case of the tornado, on visiting the path it makes through a forest, and finding the trees thrown down as stated by Mr. Espy; and to him it appeared perfectly conclusive, that there must have been such a direct inward motion in the tornadoes described by the author of this paper.

Mr. Espy had disposed of this objection in his explanation of the tornado, where he shewed that all bodies taken up on the right-hand of the centre of the path of the tornado must, from the laws of dynamics, go up in a spiral from right to left; while those taken up on the left-hand of the path must move in a spiral upwards, from left to right; and that consequently one person might see the tornado whirl in one direction, and another in the other, according to the uniform testimony of the witnesses, along the whole tract of the tornado.

Professor Forbes presented three difficulties as objections, which he requested Mr. Espy to answer:—1st, How it was possible to conceive that such a mighty mass of air as he represented, pressing in towards a common centre for hundreds of miles around, could find vent up the very narrow vortex in the centre of the storm? It would require very strong proof to overcome the *à priori* improbability that such was the case. 2d, That as the tornado had an onward motion, it appeared to him difficult to find phenomena, on viewing the path of a tornado, which would prove without doubt that the motion of the air was inwards to a common centre; for the manner in which trees were thrown down would depend very much on the velocity of the onward motion, compared with the velocity of the wind in the tornado itself. 3d, He thought Mr. Espy would find that nearly all the vapour in the air would be condensed into water or cloud on going up the ascending column, before reaching any very great height in the atmosphere; and it seemed difficult for him to conceive how the principle of the evolution of latent caloric could produce so great an effect in the comparatively short column of the atmosphere, to cause the barometer to sink as much as it is known to do in great storms.

Mr. Espy took these objections in their inverse order. He stated, as to the last objection, that if all the vapour should be condensed into water, the effect would be found to be even greater than he had stated in depressing the barometer; for it was known that, for example, if the dew-point was 70° of Fahr., it contained latent caloric enough to heat the whole atmosphere about 70°, and, of course, half the atmosphere to double that amount; and the Professor would find on calculation that the barometer would fall under such a column of

70°, 4-48ths of 30 inches. His (Mr. Espy's) calculation had been made on the supposition that only about three-fourths of the vapour ever is condensed, however high the column may ascend. To the second objection Mr. Espy replied, that Mr. Redfield himself had proposed as a test of the truth of Mr. Espy's doctrine of inward motion, that the trees in the centre of the path should be found with their tops thrown either backwards or forwards, and he (Mr. Espy) introduced Professor Holmstead's testimony that such was the fact in the Newhaven tornado. And as to the great hurricanes in the West Indies, Mr. Redfield stated it would be a proof of Mr. Espy's doctrine, if it should be found that those storms began with the wind north-westerly, and ended south-easterly; and to prove that this was the fact, Mr. Espy quoted Edwards' "History of Jamaica," and also the fourth volume of the "Royal Philosophical Transactions," where it is stated that these storms begin with the wind north-west, and, when the wind gets round south-east, the foul weather breaks up. To the first objection Mr. Espy replied, that he did not mean to say that in the large storms of several hundred miles wide they pressed in to the centre to a very narrow vortex before it began to ascend; on the contrary, however wide the cloud extended, it must be going upward, there to form that cloud, frequently leaving a wide space in the centre, where there was a dead calm; and as to the tornadoes, where the vortex was very narrow, not more than two or three hundred yards wide in many cases, it was a perfectly well-established fact that all round the tornado, before and behind, and at the sides, it was a dead calm within a very few yards of the tornado itself: which fact was explained in that part of his paper which had not been read.

Mr. Osler stated that, from the investigations he had given the subject, he was convinced that the centripetal action described by Mr. Espy took place in most hurricanes: the particulars he (Mr. O.) had collected, together with the indications obtained from the anemometers at Birmingham and Plymouth, satisfied him that the action of the great storm of the 6th and 7th of January, 1839, was not rotatory *at the surface of the earth* when it passed over England. He differed, however, from both Mr. Espy and Mr. Redfield in one essential point, for he believed that it would be almost impossible for a violent hurricane to take place without at the same time having *both rotatory and centripetal* action. The storm might very probably be generated, in the first instance, in the manner accounted for by Mr. Espy, as well as occasionally by contrary currents; in the first case, the rush of air towards a spot of greater or less diameter would not be perfectly uniform, owing to the varying state of the surrounding atmosphere; this, together with the upward tendency of the current, would, in some cases, produce a violent eddy, or rotatory motion, and a whirlwind, of a diameter varying with the cause, would ensue. The centripetal action would thus be immensely increased, the whirlwind itself demanding a vast supply of air, which would be constantly thrown off spirally upwards, and diffused over the upper atmosphere: thus causing the high state of the barometer which surrounds a storm. When no rotatory action takes place, we merely experience the rush of air which necessarily precedes a fall of rain or a thunder-storm, in consequence of the condensation of moisture: but that nothing violent enough to be called a hurricane can take place unless a strong rotatory action, or in fact a whirlwind, is produced; and that in most cases the rotating portion is not in contact with the earth, and consequently we only felt its secondary or centripetal action. He further stated that he had brought a short notice of his theory of the combined action of the rotatory and centripetal motion of storms before this Association, at their late meeting in Birmingham.

Professor Thomson said he could conceive a centripetal motion of the air causing a whirl, especially from the principle of the conservation of areas, as it appeared to him unphilosophical to assign a whirl as the cause of centripetal motion.

Professor Stevelly made some observations as to the probability of human feeling being a proper criterion of temperature in clouds.

Dr. Forbes said, if he understood Mr. Espy, he assigned the reason of the fall of the barometer to the vapour which the air contained.

Mr. Espy replied, that he did not wish to be so understood, but the sole cause was the solution of the latent caloric during the formation of cloud.

Mr. Miller thought, from the experiments of Dalton, that the more vapour the air contained, the greater its specific gravity.

Mr. Espy simply dissented; and Professor Forbes expressed his dissent also.

The Chairman complimented the author on the able manner in which he had treated the subject. It would be difficult to come to a conclusion on some of the points brought forward; but he was certain that such an interest had been awakened as to insure farther prosecution of the inquiry.

The Section then adjourned.

SECTION B.—*Chemistry.*
Papers and Communications.

1. Dr. Schäfhaeutl, 'On a New Mode of Photogenic Drawing.'
2. Professor Graham's 'Notice of Professor Liebig's New Chemical Views relative to Agriculture and Physiology.'
3. Dr. Playfair, 'On a new Fat Acid called Serecic Acid.'
4. Dr. Ettling, 'On Salicyl.'
5. Professor Liebig, 'On Poisons, Contagions, and Miasms.'

The author of paper No. 1. described two methods of producing photogenic drawings, one similar to Mr. Talbot's mode, which he termed the negative, and the other with the prepared paper or metallic plates, the positive method. Take, for the negative, Penny's improved metallic paper, and draw it over the surface of a concentrated solution of nitrate of silver, and then convert the nitrate adhering into a chloride by the vapour of boiling muriatic acid. This coating of chloride, when dry, should be again drawn over the solution of the nitrate and again dried; and thus may a paper of the greatest sensitiveness be produced. The manner of fixing the drawing is a more complicate affair, and requires great care; it should be immersed in alcohol for five or ten minutes, then dried, first by blotting paper and afterwards, slightly, before the fire, and then drawn through a dilute muriatic acid, into which a few drops of an acid nitrate of mercury had been put. The care required is principally for the exact quantity of the latter ingredient, to be known best by frequent testing. After being thus treated, washed in water, and dried at a temperature of about 158° Fahrenheit, a slight yellow tint appearing on the previously white portions of the paper shews that the fixing is effected. For the positive method the paper, prepared as above, is allowed to darken in the sun, and then to macerate for half an hour or more (not too long, or it will darken again) in the acid solution of the nitrate of mercury, mixed with nine or ten parts of alcohol. The paper thus macerated should then be drawn rapidly over dilute hydrochloric acid, washed in water, and dried at a temperature of about 212° Fahrenheit. It is now ready to take the drawing, to fix which a short immersion in alcohol, to dissolve the free bichloride of mercury, is alone necessary. If metallic plates are used for the positive process they should be coated with hydruret of carbon, the residuum of pitch dissolved in alcohol, be carbonised in cast-iron boxes, when cooled, be passed through polished steel rollers, be then plunged into a solution of nitrate of silver, and afterwards immediately submitted to the sun's rays in the camera obscura. An immediate reduction of the silver to the metallic state takes place, and the image is caught: no delay should occur in fixing, by dipping the plate in alcohol, into which a portion of hyposulphite of soda, or a small quantity of ammonia, had been put, because of the excessive sensibility of the plate in that state to light. The carbonised portions present the shade, and the varying thicknesses of the silver, in appearance frosted, give the lights of the picture.

An abstract only of Professor Liebig's Report, No. 2, was next read by Professor Graham. In opposition to the opinion hitherto held, that the fertility of soil was relative to the quantity of what has been termed humus contained therein, and from which it was supposed plants chiefly derived nourishment, Prof. Liebig contends that humus, as it exists in soil, cannot yield sustenance to plants. Humus, or the humic acid of chemists, is soluble when first precipitated, but insoluble when dried in air. To overcome this difficulty, the physiologists, or the holders of the opinion before stated, suppose that the alkalies from consumed vegetables solve the humic acid, and prepare it for assimilation. Granting, however, that the humate of lime thus produced is absorbed by plants, Professor Liebig argues that from the quantity of the alkaline bases of the ashes of plants in proportion to the carbon of fir wood, for instance, or of wheat straw, not one-thirtieth of that of the former, nor one-twentieth of that of the latter, could be derived from humate of lime. Moreover, 2500 parts of water are necessary for the solution of the humate; and if the whole of the rain falling on a given space becoming saturated with that salt, and being absorbed by the plants, were calculated (which is possible), the humate could not yield any thing like the quantity of carbon contained in the wheat there grown. For these and other reasons, the principal of which is, that decayed plants give origin to humus, and that none could have existed unless so produced, Professor Liebig concludes that the decomposition of carbonic acid, chiefly and almost entirely derived from the atmosphere, affords the carbon of plants. After remarking upon the effect of light on the vegetative process, and the chemical operation during the night, &c., the abstract dwelt upon the part the humus really plays in vegetation. That substance, which is nothing more than decayed woody fibre, converts oxygen into carbonic acid, and hence humus is a continued source of that necessary principle of plants; and, therefore, giving free access of the air to the humus by the loosening of the soil, by tilling, &c., increases the production of carbonic acid; and in that way cultivation is highly beneficial. Turning up the ground is not, however, so requisite when the leaves or lungs of the plant are fully developed, for then the carbonic acid of the soil is no longer wanted. The assimilation of hydrogen, also the assimilation of nitrogen and its origin, were fully treated.

Ammonia plays an important part in vegetation, and it is found in large quantities in the juices of some plants. It exists plentifully in different manures; and from its presence, especially in the animal, they principally derive their utility and value. Ammonia also forms the red and blue colouring matter of flowers. In short, the elements required for the support of vegetables and animals are contained in ammonia, carbonic acid, and water. The abstract then passed on to the inorganic substances, the alkalies or alkaline earths, wanting for the full developement of plants, and to the application of the principles contained in the report to the art of culture; including the use of humus, nutrition and growth of plants, advantage of azotised matter, effect of food on the produce, the constitution of soils, their fertility, &c. &c. &c. The subjects were exceedingly numerous, and all of the highest interest and value; and well and truly did Dr. Gregory designate the report as most important. It was, he said, the first attempt to apply the recent science of organic chemistry to agriculture, and justly proud may the British Association be of, by their recommendation, originating such a work.

The radicals of serecic acid, Dr. Playfair (No. 3) considered similar to those of œnanthic acid, with, however, one equivalent of oxygen substituted for one of hydrogen. The constituents of serecic acid are C 28, H 54, O 3.

No. 4. The oil distilled from *Spiræa ulmaria* separates by keeping into two oils, the one lighter, the other heavier, than water, and Dr. Ettling shews that the latter is similar in composition to hydrated benzoic acid. Its compounds with ammonia were stated to be highly interesting. The final product belongs to the amides, and is called salicylamide. It combines with copper, lead, iron, &c. &c.

Dr. Playfair read paper No. 5.—Professor Liebig speaks of poisons as inorganic and organic. Several were called inorganic, such as sulphuric and muriatic acids, the action of which on the animal system may be likened to that of heated iron or a sharp knife. But the really inorganic poisons are those which, entering into combination with animal substances, become insoluble and incapable of change, and therefore destroy organic life. The organic poisons, especially putrid animal and contagious matter, seem to possess a peculiar property which is of very universal action, viz. the power to induce in any substance with which it may be in contact its own state of motion or decomposition. In Germany a disease is known which arises from the consumption of decayed sausages, and which produces, as it were, a mummification of the body ere death, for no corpse after this disease putrifies. The state of the motion or decomposition of the materials of the sausages induce the same condition in the constituents of the blood, too powerful for the vital principle, decomposition and wasting away go on, and death is the result. Contagious matter, in like manner, acts upon the blood, inducing in it its own state of change, and reproduces itself as yeast in fermentation. The action of yeast and contagion were shewn to arise from the same cause. And the working of two kinds of yeast, the one violent, and the other tranquil, were assimilated to the action of the human small-pox and the virus of the cow in the human blood. After some remarks from Professor Hanney and Dr. Playfair in explanation principally to this, that the object of the paper being so purely chemical in the inquiry was to attract the attention of physiologists to the further developement of the subject, the Section adjourned.

SECTION C.—*Geology.*

1. Mr. Bald, to Exhibit a Model of a large Portion of Ireland.
2. Mr. Ravenstein, 'On Krummer's Relief Map' (to be read by Capt. Washington).
3. Dr. Robinson, 'On M. de Bertou's Map of Palestine' (read by Capt. Washington).
4. Capt. Washington, 'On the New Maps in Progress in Germany.'
5. Mr. Ainsworth, 'On a Recent Visit to Al Hadr, in Mesopotamia.'
6. Mr. W. C. Treveiyan, 'On Changes of Level in the Faroe Islands.'
7. Mr. Mathie Hamilton, 'On Earthquakes of the West Coast of South America in 1833.'
8. Mr. B. Ibbetson, 'On a Method of Drawing Fossils by the Daguerréotype.'

Mr. Greenough, President, in the chair.—Mr. Bald read a paper 'On the Value of Topographical Maps and Models,' and exhibited his beautiful Map of the County of Mayo, in Ireland; which, if we remember rightly, we saw at Mr. Greenough's *conversazione* in London. This map is on the scale of two inches to a mile, and represents admirably the remarkable physical features of that region; the levels of the mountains, hills, lakes, plains, &c. are all given, both barometrically and trigonometrically; and at the foot of the map is a vertical section of the country from east to west, describing its geological structure, besides various views, profiles, &c. Accompanying the map was a model, of seven feet six inches by five feet, on the scale of four inches to a mile. In the course of his paper Mr. Bald gave an account of the various methods of modelling, and strongly recommended their more general use, as giving a better idea of the country than any other mode can. This paper was listened to with much interest, and gave rise to a long conversation, in which Mr. Greenough, Mr. Ibbetson, Lord Northampton, Major Chartres, Mr. Featherstonehaugh, Captain Washington, and others, bore a part.

Mr. Ibbetson gave some account of the method he pursued in making his models of Neuchatel and of the Isle of Wight, and spoke generally of the relative value of barometric and trigonometric measurements.

Mr. Featherstonehaugh stated that, in the recent examination of the boundary-line of Maine and New Brunswick by himself and Col. Mudge, he had used twelve mountain-barometers by Bunten, of Paris, which he preferred to all others. Captain Washington contended that, for all practical purposes, the barometers of Newman, of London, were fully equal, if not superior, to the syphon-barometers of Bunten, in which it was difficult to read off the lower vernier with accuracy. Mr. Featherstonehaugh admitted that latterly, in completing the survey, four of Newman's barometers had been used, and had given every satisfaction.

'Some Observations on Relief Maps,' by Mr. A. Ravenstein of Frankfort. Communicated by Captain Washington, R.N.—"The obvious advantages of maps stamped in relief for representing the great physical features of a country, and the probability that such maps will soon be very extensively used, induces me to offer a few words in reply to a request I have received to state my opinion on the relief maps of M. Krummer of Berlin. With regard to their invention, I must claim to have been the first who introduced the method of raising the hills by means of the press, or stamping, as may be seen by my 'Plastic Atlas,' published in 1838. It would be unjust, therefore, to attribute to Berlin that which was first made at Frankfort. It must be observed that these are quite distinct from M. Krummer's '*Globe en Relief*,' published some years since, as that was made of *papier mâché*. M. Bauerkeller, of Paris, also made public, in 1839, his '*Environs de Paris*,' in the stamped relief method; with the difference, however, that the colours are put in after the Congreve manner. In the preface to my 'Plastic Atlas' I anticipate that great improvements would be made; and it is due to M. Krummer to state that he has so far succeeded as to lead me to hope that these maps will shortly reach still greater perfection, and, when made on a large scale, will come into general use, and supersede all other maps,—and especially physico-geographical maps, without reference to political divisions; and I am satisfied that I do but express the feeling of all interested in the advancement of physical geography by saying, that I heartily hope that M. Krummer will persevere in his efforts." These brief observations were illustrated by M. Ravenstein's "Plastic Atlas," several stamped maps, by Krummer of Berlin, and a beautiful specimen of Bauerkeller's stamped and coloured plan of the city of Frankfort. In making some remarks on these maps, Captain Washington stated that, in the course of a recent visit to Germany to complete the collection belonging to the Geographical Society of London, he had been much gratified by the maps published at the topographical establishments at Vienna and Dresden; also, by the models in relief of the Taunus mountains and the Siebengebirge, as well as by a relief map of the Rhine, from Mainz to Bonn, by M. Ravenstein of Frankfort. In speaking of school maps, Captain Washington stated that he had been much gratified by the specimens of the "Church Assembly School Maps," then exhibited. These maps, published by Messrs. Fraser and Crawford of Edinburgh, he lauded for their peculiar excellence. The convenient mode by which they were exhibited on the stand, and the whole getting up, were highly creditable to the publishers. He considered, indeed, that they were equal, if not superior, to any he had ever seen.

'Additional Notes on the Wadi el 'Arabah in Syria,' by the Rev. Dr. E. Robinson, of New York. Communicated by Captain Washington, R.N.—"The interest attached to that very remarkable fact in physical geography which has not yet been cleared up,—namely, the depression of the surface of the Dead Sea (from 600 to 1400 feet, according to different measurements) below the level of the Mediterranean, and the drainage, probably dependent upon this depression, of a large tract of country including numerous lateral valleys, extending to the southward for upwards of 100 miles through the district termed Arabia Petræa, from the south point of the Dead Sea nearly to the Gulf of Akabah, induces me to offer a few words on the line of separation of waters between these two basins, which may be termed a postscript to some remarks I formerly had occasion to make on M. de Bertou's account of his journey in 1838, through the Wadi el 'Arabah, from the Asphaltic Lake to the Elanitic Gulf. At that time I took it for granted that the Wadi Talha of Bertou (according to his own map) was identical with the great Wadi Jerafeh, with which we had become acquainted while travelling through the western desert to Hebron, and again as seen from the pass of Nemela, north of Mount Hor. But on a careful reconstruction of Bertou's itinerary by M. Kiepert of Berlin, it appears that his Wadi Talha must be situated about two hours south of the Jerafeh, and has no connexion whatever with the latter. It would seem, therefore, to be the Wadi Abu Talha of Burckhardt. The effect of this is to move the

place of the watershed, as specified by Bertou, to a point some six miles farther south than I had supposed him to mean; and if this cannot be well founded, it follows that the traveller passed before, and probably across, the mouth of the Jerafeh without noticing it; although this is the great drain of all the adjacent part of the western desert, and one of the most important and remarkable features of the whole region."

In connexion with Dr. Robinson's recent travels through Palestine, Captain Washington exhibited a newly constructed plan of the city of Jerusalem, correcting many former inaccuracies, pointing out several ancient sites, and shewing the shading of the hills within the city, —a feature not represented on any former plan.

Mr. W. C. Trevelyan communicated a letter from the Rev. Mr. Schroter, who had resided above fifty years in the Faroe Islands, expressing an opinion that the level of the coast had there undergone a depression. This was inferred from encroachments made by the sea at several points, and particularly from the fact that, on the 6th of January, 1828, fully two-thirds of the sun's orb had been visible above a hill near his house, from the same spot where, in 1801, he had only been able to see the upper disk.* Captain Washington suggested that this effect might probably be accounted for by refraction; but Mr. Trevelyan conceived that the steady occurrence and similar observations in other quarters gave room to infer an actual change of level. Mr. Yates and Mr. Greenough observed that the fact, if it really existed, was very important; and that further and careful observations on the subject were desirable.

Mr. Mathie Hamilton read a paper 'On Earthquakes of the West Coast of South America, in 1833.' This paper described the destruction which these earthquakes caused in several towns, and assigned the following generalisation of the subject. When the atmosphere became clear, the Andes, as seen from Tacna, presented a novel spectacle; those mountains, in many parts, appeared with a new surface; large portions had been thrown off, and slid down into valleys or ravines below, leaving some of the more elevated peaks denuded of what had been their more prominent limbs; also large masses of snow were detached from some of the higher pinnacles. Within the last few years, an important subterranean change seemed to have happened below that portion of the earth's surface. From time immemorial, every shock of earthquake there was preceded by a subterranean noise; but since the great earthquake of the 8th of October, 1831, this warning had been seldom, if ever, heard; formerly the people had time to run from the houses to some open place, between the commencement of the noise and the shock. This subterranean noise was not unlike that of thunder, as it is heard when rolling among the valleys of the Andes far below places where the traveller has to traverse those sublime heights.

From what has been stated, Mr. Hamilton thought we might conclude that there was a vast cavity beneath the surface of that region, which cavity contained the chief agents of convulsion; also, at the moment of convulsion, that the earth's surface was strongly charged with positive electricity.

Geology.—This day might be considered the grand field-day of the Geologists; and it was, indeed, of almost unpreceded brilliancy and enjoyment. The excursion to Arran, an island justly styled by Mr. Murchison "the Jewel of Geologists," was divided into two parties,* the one proceeding and returning altogether by water in the Flambeau steamer, and the other taking a portion of the way by the railroad to and from Ardrossan, and thence, by steamboat, across to the island. It was our good fortune to belong to the latter expedition; though from the account given of the other it seems also to have had a full share of instructive pleasure. Both, indeed, participated in a genuine feast of reason, heightened by the addition of natural beauties, and glorious scenery not to be surpassed in any region of the globe. The following is the history of the Flambeau† trip, which left Glasgow at six o'clock of the morning, and consisted of about a hundred persons:—The arrangements were directed by Professor Nichol, Mr. Thomas Edington, jun., and Mr. William Murray. As they passed down the river, it was agreed that some of the gentlemen present should describe the geological features of this or any other district with which they were acquainted, and, accordingly, geological lectures and conversations occupied the party throughout the voyage. On passing the Kilpatrick Hills, where the peculiar beauties of the Vale of Clyde begin to appear, Mr. Craig gave a short detail of the nature of the formation that skirts that range, and which is to be considered as belonging to the regular carboniferous series of the district. He alluded to certain beds of conglomerate, seen extending from Muirhouse, near Edinbarnet, to Craigmaddie and Strathblane. These he considered as underlaying a bed of sandstone, which crops out below the Duntocher coal, and probably belonging to the old red sandstone. He then referred to the great limestone series, in which occurs the trap of the Kilpatrick and Campsie range, and described it as consisting of great layers of compact limestone, alternating with the shale, and as offering to the geologist a very interesting field of examination. Mr. Craig then adverted to the character of the red sandstone which occurs beyond the trap, and which skirts either bank of the Clyde. Portions of these were evidently newer than the older coals of the regular coal measures, and other portions older than them; and that the former were to be regarded as equivalents of the coal formation, rather than the new red sandstone.—Dr. Nichol next called attention to the peculiar characteristics of the Island of Arran.—Dr. Crooks explained the geological map of England.—Dr. M'Donald described some of the features in the primary rocks of Argyllshire and the northern part of the Isle of Bute. The vessel steamed through the Kyles of Bute, and as the day was exceedingly fine, the party had an opportunity of viewing the splendid scenery there to the greatest advantage. The remains of the vitrified fort, on an islet in the upper district of the Kyles, attracted much of their attention. The whole of the surrounding country, both on account of its geological character and the variety and grandeur of its scenery, seemed to interest them highly. It may not be altogether uninteresting to diverge as far from the direct course to Arran as may enable us to catch a few hasty glimpses of the geology of the neighbouring islands of Bute and Cumbrae the Larger. The former island, which has acquired so high a reputation for the mildness of its climate, is about eighteen miles in length, by about four in breadth. Its structure corresponds generally with that of the adjacent islands, which it unites geologically with the mainland in Argyllshire, from which it is separated by the romantic winding strait known by the name of the Kyles of Bute. Dr. M'Culloch, whose useful and agreeable work on the Western Isles we shall partly take as our guide-book, found the geology of Bute peculiarly valuable, as elucidating some of the more obscure portions of the Island of Arran. On approaching Bute, it is seen to divide itself naturally into three parts, equally distinct in their general form and mineral structure. The northern division consists of primary rocks—micaceous schist, clay slate, chlorite schist, and greywacke, often traversed by trap and quartz veins. The central division is chiefly composed of sandstone, and the land is low and undulating. The southern district consists of a ridgy group of hills terminating in the promontory of the Ganoch Head, and wholly of trap rocks. The intermediate valleys afford evidence in their coralline sand, clay and sand abraded from the rocks of the secondary strata, and vegetable matter, as well as in their remarkable flatness and lowness, that the sea has flowed through them at no remote geological period. Bute is, therefore, connected geologically with Argyllshire by the primary rocks on the north, and with Ayrshire by the secondary strata of the south. Supposing we start from Rothsay Bay on our course to Arran, as the steamboats are in the habit of doing, a number of the more interesting geological features of Bute may be observed from the deck of the vessel. Thus in skirting the shore as we leave the bay, the more prominent of the trap dykes which abound here may be seen traversing the sandstone and conglomerate on the beach. These are not laid down in M'Culloch's maps, nor do we remember having seen them in any other; but they are very readily discoverable in walking or sailing along the shore. A quarry has been opened on the Chapel Hill at Rothsay, where the trap bursts out near the junction of the red sandstone and argillaceous schistose series. On the opposite shore of the bay, the point from which we are now starting, and in a direct line across from the quarry, the trap is observed cutting the sandstone along the shore eastward for a considerable distance, till it reaches Bognay Point, and, were it to continue in the same direction, would here run into the sea. But, singularly enough, when we round the Point, and proceed in a south-westerly direction, we find the trap vein has turned also, and that it treads along the shore to near Ascog, where it is lost in the sea. This strikingly beautiful vein, which on either side of Bognay Point maintains the accurate parallelism of a railroad, which it very much resembles, is repeatedly intersected at right angles by other veins, which run up from the sea through the conglomerate masses of the raised beach; and probably, as in one instance we have observed, crop out on the heights of the superincumbent sandstone. The interest of these phenomena will be understood by the ordinary reader to consist in the curious conjunction of the aqueous and igneous agencies, and in the obvious fact that these veins must have been discharged by volcanic influence, through the stratified rocks and raised beaches, at a period subsequent to their deposition. As we proceed southward, and near to Ascog, the grey or whitish appearance of the rocks on the shore indicates a small irregular bed of limestone, the boundaries of which graduate into the contiguous rocks; from which, indeed, it is

* Query:—May not the spot from which the observation was made have risen, which would produce the same effect?

* There was also a third body in the William Wallace steamer.

† Handsomely placed at the disposal of the Section by the Proprietors.

scarcely distinguishable. Similar appearances are also common in Arran. A large overlaying mass of trap occurs at Ascog, which is the more remarkable as being the repository of a bed of coal, corresponding exactly in its structure and quality to the Arran formation. Onward, the trap may be seen frequently alternating with the sandstone, till, arriving at Kilchattan Bay, we reach the southern portion of the island, and find the trap exclusively. Even the hasty view of these rocks caught from the deck of a steamboat, will convince the least practised observer that there is something interesting, if not peculiar, about their conformation and arrangement. They are disposed in ridges and prolonged valleys, the whole promontory consisting of a series of beds placed in a north-westerly direction, and dipping to the south-west in an angle of about fifteen degrees. "They present," says M'Culloch, "a perfect appearance of parallel stratification; their abrupt edges declining from the perpendicular in an angle equal to that of their dip, and often forming high inland cliffs, of greater or less extent, prolonged on the line of their bearing. Among the numerous instances of apparent stratification in trap which have occurred in the course of this survey, the present is infinitely the most regular and perfect; since, as far as I could perceive, it does not in any instance betray indications of a disposition different from those of the sandstone in which it lies." These rocks sometimes present a rudely columnar appearance on its abrupt faces, but it is more frequently amorphous. We have here a tolerable view of the outline of the Large Cumbrae, an island four miles east of Bute. The two Cumbraes are a link in the geological chain which connects Bute with the adjoining mainland. The larger of the two is three and a half miles in length by two in breadth. It corresponds in geological structure with the middle (red sandstone) district of Bute, and is chiefly interesting, in a scientific point of view, from the enormous trap-dykes with which it is traversed. The "New Statistical Account" mentions that the more remarkable of these "are two on the east side of the island running nearly parallel, and from five to six hundred yards distant from each other. The one to the north-east measures upwards of forty feet in height, nearly 100 in length, and in mean thickness from ten to twelve feet. The one to the southward is upwards of 200 feet in length, from twelve to fifteen in thickness, and from seventy to eighty feet in height; and, when viewed in a certain direction, exhibits the distant resemblance of a lion crouching; hence it is sometimes called the Lion." These dykes reappear in Ayrshire, and traverse that and the whole of the neighbouring county of Galloway. The zoology and botany of this small island are abundant and interesting. Of Arran itself the narrative observes, not merely does it exhibit every variety of natural scenery, but it presents to geology an epitome of the structure of the whole globe. Arran is the world of geology in little. As we approach the beautiful bay of Brodick we are close upon the magnificent mountain group of the island. This is the granitic region; and there is a younger and an older granite in Arran, now only laid down in the map for the first time by Mr. Ramsay, whose admirable model, sections, and sketches of the island, have brought him so advantageously before the public as a young and promising geologist. Arran should be approached by a summer sunset, and left at sunrise, when the summits of Goatfell ("the Hill of Winds") are tinted with living gold—were it only to contrast the glistering light of its bold and serrated peaks with the lurid, superstitious twilight reposing upon its flanks, which is only to be witnessed in the alpine scenery of the Highlands, and adequately described by the pencil. The mountain-group, with Goatfell "towering above the rest," to borrow the characteristic simile of the writer of the "Statistical Account," "like a proud Highland chief surrounded by the cadets of his clan," present themselves to the beholder in their full dimensions from base to summit. They look from a distance as if in the act of springing from the depths of the sea—upheaving their giant bulks of rugged and spiry granite against the clouds, and thence descending in faces of bare rock, unrelieved by the slightest shade of vegetable green, sheer down into those yawning corries and glens, which, seen from afar, resemble the mysterious gorges and masses of impenetrable shade which the telescope describes on the surface of the moon. "It is in Glen Sannox, above all," says M'Culloch, "that the effects arising from magnitude of dimension, combined with breadth of forms, and with simplicity of composition and of colouring, are most strongly felt." "The effect of silence," he adds in a note, "as a source of the sublime, is most strongly felt in these situations, as on the summit of the mountain. It is the silence of that which is seen, but is not heard, the fall of the foaming torrent, the business of the world below, too distant to reach the ear, that convey the impression. It is the silence of expectation amid the vastness of dimension, and the appearance of power. It is like that awful moment which precedes the thunder of the volcano." The shores exhibit an endless profusion of exquisite maritime views, now projecting in bold headlands and cliffs, now receding in wave-worn caverns and tranquil bays. The varied beaches are overhung with the wildest vegetation, and old ivy clings to the trees and cliffs, "all green and wildly fresh without, though worn and grey beneath." The bay of Brodick, with its animated hamlet, and retiring upon the romantic valleys of Glenrosa, Glensheraig, and Glencloy, presents a picture of delightful peace, simplicity, and loveliness; and the land-locked bay of Lamlash, with the Holy Isle rising 900 feet at its mouth, and the pretty village curving along the beach, possesses capacity for the whole fleet of the empire riding in security. Every part of the island is characterised more or less by scenes of grandeur and sublimity, or of calm and romantic beauty. The first detailed description of the geology of Arran was given by Professor Jameson, who has been succeeded by Necker, Headrick, M'Culloch, Sedgwick, Murchison, and Messrs. Oenhaüsen and Dechen, two scientific Germans. It is, of course, impossible to give even an outline of the geological structure of an island such as Arran, representing, as may be truly said, all the mineralogical features of the globe. The Flambeau party approached the island near the detached sandstone block called the Cock, at the western extremity, and sailing southward along the shore had an opportunity of seeing the series of the coal measures. At Seriden they witnessed the great phenomenon of the "fallen rocks," the effect of an avalanche of a large portion of the mountain which has rolled down upon the shore. The rock is chiefly of red sandstone conglomerate, which here occupies an immense track upon the shore, and extends to a great height up the hill. They next observed the profuse variety of the secondary strata that succeed southward till they reach Corry. Here they landed at a fine natural harbour; and armed, the geologists with hammers and bags, the botanists with vasculums, and a few of both arrayed in nondescript costume, sallied forth, to the no small astonishment of the natives, in quest of their respective objects of research. The first point of interest was the great lime-quarry of Corry, where all who chose collected specimens of the terebratulæ and productæ, which abound here in enormous quantities, resting in beds resembling those of oysters, in the position they must have occupied when upheaved from the sea, and of the madreporites which occur in smaller quantities. Here the party divided, about eighty commencing the ascent of the lofty Goatfell, the remainder penetrating Glen Sannox. The pull up the mountain from the point where they started was one of great labour, and the lighter men had for once the advantage of robust fellows, who, shouting in vain for mountain-dew, gave up the ascent in breathless despair. A haze rested upon the surrounding coast, which in a great measure obscured the commanding view from the summit, although the hill itself was without a cloud, and the prospect immediately around the island was extremely fine. For a general survey of the geological features of the island it was abundantly sufficient, and amply rewarded the toils of the party. Those who sailed by the Sir William Wallace made an easier ascent from a different point, and were met in their descent by those of the Flambeau. The surprise and delight of the strangers were boundless when they attained the summit, and found themselves as it were upon the edge of a crater of some Polynesian volcano; alike overwhelming by the vast dimensions of its circumference, its alpine altitude, and the yawning and seemingly fathomless profound in the gorges and valleys below. Here Dr. Nichol pointed out the geological characteristics of the island, so far as they could be discovered from such a position. His knowledge of the district being intimate and extensive, the absence of any of the great geologists was only regretted by himself; and three cheers, awakening echoes in the cliffs, testified to the pleasure the gentlemen derived from his peripatetic lectures. Numerous veins were observed of the finer-grained, and more recent granite, projected through the old and coarse-grained granite of which the group consists; and many specimens, with the two in conjunction, yielded to the hammers of the gentlemen of the "Chip-away tribe." The more recent granite bursts out in mass in another part of the group. The junction of the granite and schistose rocks, flanking the mountain, also presented an object of interest. Huge veins of trap, which traverse the strata in the lower part of the island, were here pointed out, projecting through the granite ridges of the adjacent mountains, and running from one hill to another. One of these veins, of immense size, was shewn to have suffered so much from denudation as to have left a deep cleft in the summit of the mountain. The divided parties were reunited at Brodick harbour, where they went on board pretty well appetised for dinner; and the botanists and geologists having, by common consent, agreed to merge themselves into one great Gastronomical Section, the vessel took the route to Glasgow while they discussed the substantial business of the meeting. The Flambeau reached the Broomielaw at eleven o'clock.

Having disposed of the preliminary and contemporary history of the memorable excursion

to Arran, we must, in justice and gratitude, devote a few lines of description to that division of it of which we may say *quorum pars fuimus*. It was one of those golden days to be marked with a white stone. Nature was dressed in her brightest smiles; a lovely sky above, and a lovely landscape below,—of river, littoral, glen, and mountain, of almost every form in which these various beauties can present themselves to the eye and imagination. The pellucid water, fathoms deep, so pure, as it lay in still repose under the sunny ray, that the fringy sea-weeds, — green, purple, and brown,—the many-tinged rocks and shining stones at the bottom, as well as the fanciful medusæ as they swam around, expanding into full-blown tulips or closing into globular buds, with their tentacula now coiled up, and now navigating them like the oars of a Cleopatra's galley, seemed altogether a fairy vision. Never did we witness such submarine grottoes, nor could we have supposed aught so dazzling and yet so calm: a picture of common things, the humble creations of sea and shore, so blended together in indescribable brilliancy. But before we reached these charms we had to taste the effects of human art. At seven o'clock we started in a railway train, liberally assigned by the proprietors for the conveyance of the party, about sixty in number, to Ardrossan, on the banks of Clyde, opposite to Arran. Away went the iron horse puffing and snorting, as if proud of a freight of science from which he sprung. With excellent lungs, he hardly needed a second wind to accomplish the distance in good time; and the philosophers and their companions were speedily uncarted on the strand; having, however, been subjected to the passing gaze of crowds assembled at every station,* where they had taken in or discharged other passengers. We then found that our party was rich in men who could make it both profitable and pleasant; Mr. Murchison, Dr. Buckland, Mr. Delabeche, Professor Johnston, Mr. Milne, Mr. Strickland, and other able geologists, appearing in the front ranks. The Duke of St. Alban's, Lord Sandon, Mr. Wood, Professor Miller, &c., were among the less geological personages; and M. Agassiz joined us, and the distinguished foreigners who accompanied us, when we landed at Brodick.

At Ardrossan there was a glorious scramble for a breakfast, such as it was; for the innkeepers and their tails seemed to be sore afraid of the people with the hammers and bags, as if they had come to knock their brains out (?) and carry them away. By dint of clamour, however, hunger was appeased by such cold meats as could be hurried up; and we were soon on board of the steamer to cross the Clyde, in despite of the outcry of a waiter or two, who accused some of us of not having paid the *twa* shullings for *déjeúné*. Our consciences being clear, we record this fact against whom it may concern; for though we dare to say the payment generally was quite sufficient for the provision, it may be injurious to individual geologists hereafter to have it believed that they eat and run away. Mr. Murchison, too, mentioned the matter as we landed on our return; but it produced no shullings,—only a laugh.

From Ardrossan, with, we believe, maledictions on our heads which fell harmless and ineffectual, we ascended the river towards the more northern part of the island, to afford Mr. Murchison an opportunity of pointing out the position of the stratified rocks: we then coasted along by the vale of Sannox, where we passed the anticlinal axis, and immediately found them inclined in the opposite direction. Such a lesson in geology could, perhaps, be read nowhere else so visibly and clearly on the face of the globe. In the centre of the island rises the granite mountain, whose highest serrated top is called the Goatfell; and on either side the strata of the same rocks, which it has disturbed and upheaved as it burst in molten fires from the bowels of the earth, are thrown into almost vertical or highly angular forms, dipping on the one hand to the north, and on the other to the south. You distinctly see that these quondam plains of various deposits of the tertiary period must have been disruptured and thrown to the right and left in every direction by the more recent intrusion. And the newer granite, too, noticed by Mr. Ramsay, demonstrates that this grand and terrible phenomenon must have occurred at comparatively a very modern geological epoch. In short, the operation of the igneous upon the stratified rocks is admirably exemplified; and the theory, in this respect, confirmed beyond the possibility of question. Between Brodick Bay and the Holy Island, two or three adventurous puntfulls landed, to examine another proof of this formation in a singular dyke of pitchstone (resembling obsidian), which has evidently forced its liquid and burning way through the red sandstone, and converted that material by induration, where it came into contact with its fiery mass, both above and below, into a compact material, quite different from the immediately adjacent portions of the same body.

About three o'clock we landed at Brodick Bay, and were received by the Marquess of Douglas with the grace and courtesy of a princely gentleman, and the hospitality of a Highland chief. With Lord Ossulston and Mr. Oswald to support him as croupiers, his lordship did the honours of the Castle in a manner at once so kindly and so refined, that it made a strong impression upon the least observant of his guests; and we have pleasure in recording a circumstance which added so gratifying a zest even to the high enjoyments of a day rarely to be equalled in the mixed pursuits of life. An hour fleeted like a minute in paying due attention to the results of the noble Marquess and his friends' natural history and ornithological pursuits, displayed in the forms of venison and grouse; to the renewed study of which, under their changed aspects, the geologists, with appetites improved by exercise and air after an Ardrossan breakfast, were well inclined to transfer their regards from shale, mica slate, old red sandstone, and trap or whinstone dykes. Nor ought the champagne and hock to be forgotten; nor the speeches, judiciously and gracefully acknowledged by our host; nor the piper, who, having played us up to the Castle, was in little more than an hour called upon to play us "back again."

Nor was the return impaired by the indulgence in this lively episode. On the contrary, it gave new spirit to the succeeding scene. The sun was descending in a blaze of crimson light upon the Goatfell, when Professor Johnston was pressed to give a lecture upon the travel of the day, and the connexion between chemistry and geology, which the glowing features around exhibited to our view. And we never listened to an explanation in which the great truths of science were more eloquently (in some parts sublimely) illustrated than by the learned Professor, who was inspired beyond the retort and crucible by the resplendent character of all Nature around. After a good-humoured exordium on the slantindicular inclination of the upheaved strata by the tossification of the central granite, the learned Professor stated that all these rocks, various and different as they were, consisted but of three simple substances,* viz. *Silica, Alumina, and Lime.* As these entered into compounds in different proportions, they gave us every variety of matter upon which the geologist founded his observations; and as they were acted upon by heat or atmospheric influence their structure became changed, and we could readily trace that influence upon their constituent parts. What he could do in his laboratory, Nature only did on the largest scale. Thus, if he applied intense heat to sandstone its character was not destroyed, and it only became a little less stratified or laminated; but it never melted. Again, if he applied fervent heat to the clay rocks, the effect was still less apparent: they did not alter even in form. And, lastly, if he applied the heat to lime, it entirely changed; it was converted into quick-lime: and, if exposed to a yet fiercer degree of heat, in a gun barrel (for instance), or closed vessel, it was turned into marble. Such were the effects of heat, separately, upon sand, which was essentially silica; upon clay, which was essentially alumina; and upon lime. But if the three were exposed to heat and fused together, an entirely new substance was formed, and that substance was granite. And here was the grand work of Nature of which he had spoken. She applied her internal fires to the matters of which the stratified crust of the globe was composed, and out of the furnaces uprose the boiling and resistless floods of granite, which, when gradually cooled, presented the wildly dark-serrated cliffs which, if they turned their eyes to the Goatfell, they would now see beaming with the light of the sun before them. "Happy are we," exclaimed the learned Professor, in an animated strain,—"happy are we who live in days like this, when we can luxuriate in the contemplation of these splendid objects, and witness the peaceful descent of that glorious luminary upon the glowing hills and lovely glens of Arran! How different the time when that very Goatfell was bursting from its bounds in the burning caldron below, upheaving these ridges from their levels, and scattering destruction on every side! We are, indeed, given to inhabit the earth when terror and dismay have been expended, and intellect can be nobly employed in endeavouring to account for the ruins now converted into scenes of abundance and tranquillity. And again we see Nature at work in reconverting her materials. By the action of water and air upon that mass of granite, it is resolved into its original component parts; and being washed or crumbled down to the valleys or shores of the sea, once more takes up its position in strata of silica, alumina, or lime." Much more was delivered in this fine discourse, which truly made a Geological Section worth attending; but our memory, which has failed us much in endeavouring to recollect Mr. Johnston's admirable language and expressions, will not enable us to follow him farther.

We shall only add another geological description of Arran (amusing, if not sublime), which we heard from an inhabitant of the island, near whom we happened to be seated at the Brodick Castle entertainment:—

"Our island (said he), according to the best information which has been handed down to

* This was very conspicuous at Dalry, where the crowd upon the bridge and parapets along the train-way, in Highland costumes and attitudes, had a striking and picturesque appearance. The ruins of Kilwinning also presented a fine object.

* He abstained from going into more detailed views.

us, was thus made:—The Almighty, having formed the yearth, just threw the riddlings into the sea, and so made Arran!!!"

SECTION D.—*Zoology and Natural History.*
Papers and Communications.

1. Sir T. Phillips, 'Notice of a Remarkable Root of a Beech-tree.'
2. Professor Robb, 'Remarks on an Anomalous Form of the Plum observed, in the Gardens of New Brunswick.'
3. Mr. Wilson, to exhibit a series of Specimens illustrative of Mr. Shaw's 'Observations on the Developement of the Salmon.'
4. Mr. Adair, to exhibit a Specimen of the *Patella Ancyloides*.

Sir William Jardine in the chair.—The Chairman exhibited a specimen, which had been sent by Sir Thomas Phillips, of the root of a beech-tree, which had been reduced to a fibrous state by having grown for a long period in water. It was stated that during the period of its immersion it had absorbed a large tankfull of water. Dr. Neill said that a similar specimen, varying slightly in appearance from that now produced, had been sent to him by Mr. Reddock, of Falkirk, and that in both instances the spongioles were acicular.

Dr. Arnott observed, that roots in water were terminated by aciculæ, and in the earth by knobs. On the motion of Dr. Arnott, it was agreed to send the specimen to the Botanical Museum.

The Secretary read the paper No. 2, 'On the Anomalous Form of the Plum, observed in the Gardens of New Brunswick,' by Professor Robb, of that University. Drawings of the fruit were exhibited. The peculiarity of form had been considered to have been produced by insects, but Professor Robb, from close observation, had every reason to believe that the cold winds and heavy rains during the flowering season had caused the anomalous form.

Dr. Arnott differed from the author, in considering that the effect had been produced by insects; he had seen the anomalous form so produced. The effect of excessive moisture, he observed, was a profuse developement of leaves. Dr. Lankester mentioned several cases of abnormal developement of leaves from the deposition, in the tissues, of the ova of insects.

Mr. James Wilson exhibited a series of specimens illustrative of Mr. Shaw's 'Observations on the Developement of the Salmon' (No. 3.) Mr. Wilson stated, that having devoted his attention to the subject, he had now become satisfied of the accuracy of Mr. Shaw's views, already published in the fourteenth volume of the "Transactions" of the Royal Society of Edinburgh. He then proceeded to read the novel portion of Mr. Shaw's interesting paper, detailing the mode and results of his experiments, and illustrating them by the specimens, which were left in the Section for the inspection of members. The result obtained is, that the parr is one form of the fry of the salmon. The Chairman was quite satisfied with the experiments of Mr. Shaw, the *modus operandi* of which he had witnessed, and he considered the question of the relation of the parr settled. Dr. Lankester asked, whether any structural difference had been observed between different individuals of the salmon species, with a view of throwing light on a difficulty he had experienced in distinguishing two species of bream, *Abramis brama*, and *A. blicca*. If there had, the difference in the structure and relative size of the parts of these hitherto believed two species of bream, would lead him to think the *A. blicca* was only an early stage of growth of the *A. brama*. The difference of structure in the bream observed by Dr. Lankester related principally to the fins; and Mr. Forbes remarked that the fins, the most to be depended upon, distinguished the species; and where they did not afford permanent characteristics, they must be the exception to the rule.

Mr. Adair exhibited a number of shells from Lough Strangford, in County Down, Ireland; also the *Patella Ancyloides*, found on the Isle of Arran, the only specimen known to exist in Scotland or England.

Mr. Forbes said it was not a patella, but a lottia; or rather, it was a shell of the former inhabited by a species of the latter.

SECTION E.—*Medical.*
Papers and Communications.

1. Mr. James Douglas, 'On Dislocation of the Ankle.'
2. Mr. John Dunn, 'On the Vital Statistics of Scarborough.'
3. Dr. Henry Lonsdale, 'On Exostoses.'
4. Sir David Dickson. Several cases.

Dr. James Watson, President, in the chair.—The first paper read was 'On Blindness, produced by Sulphuric Acid,' by Robert Dundas Thomson, M.D., Physician to the Blenheim Street Dispensary and Infirmary for Diseases of the Skin, London. The author in this paper gave an account of a case which lately appeared at the Central Criminal Court. A woman, in a fit of passion, threw a quantity of sulphuric acid upon the face of a cabmaster, and when the author visited him professionally soon after, he found the vision of his right eye destroyed. On making accurate inquiry, it appeared that the acid remained in contact with the eye for two minutes before the unfortunate sufferer could obtain some water to wash off the deleterious agent. It occurred to the author, from this statement, that the agency of the acid could not have extended to any considerable depth. The structure of the cornea, the object injured, also strengthened this opinion. He therefore instituted a series of experiments, the result of which has proved of the most satisfactory character. He found that when the common oil of vitriol is brought in contact with the dead eye, it produces a milkiness, gradually an opalescence, and in the course of two minutes complete opalescence or destruction of vision. The cause of this is the formation of a false membrane, by the agency of the oil of vitriol, upon the organised albumen of the cornea. But the most interesting fact is, that the membrane can be readily separated from the entire portion of the cornea by means of a sharp-pointed knife. So that the author has introduced into practice a most important new operation, simple of execution, and one which cannot fail to restore the vision of those who have been so unfortunate as to be deprived of their eyesight by the agency of sulphuric acid. The author's experiments threw much light also on the formation of false membranes, as in croup, for which he suggested the simple remedy of neutralising, by means of ammonia, the acid secreted by the mucous membrane of the windpipe. The author also suggested that his results might lead the way to further inquiries into those forms of blindness which are produced by deposition of albumen, and on various opacities of the cornea: the capacity of cure depending on the relative position of the deposited matter to the external surface of the cornea.

Mr. James Douglas read a paper 'On Dislocations of the Ankle, forward and backward.' He shewed a preparation of the former dislocation, from which it appeared that it was accompanied with fracture, and that the displacement was not so far forward as stated by Sir A. Cooper; also a preparation of an injury which was supposed to have been a dislocation backward, but turned out, on dissection, to be a fracture; and contended that there is no such thing as dislocation backwards. He also exhibited casts of two limbs taken before dissection.—Professor A. Buchanan concurred with Mr. Douglas, and stated that he had seen a similar case a few days ago.

Mr. Douglas also shewed a portion of a skull in which the hole made by the operation of trepanning had become closed with bone, which had hitherto been denied.

A paper by Mr. Dunn was read, 'On the Vital Statistics of Scarborough.'

Several cases were read, transmitted by Sir David Dickson, from the Naval Hospital.

SECTION F.—*Statistics.*
Papers and Communications.

1. Mr. Alexander Watt, 'Comparative View of the Vital Statistics of Edinburgh and Glasgow during the year 1839; with Remarks on the Sanatory Condition of Large Towns, and on the Present State of the Registers of Births, Marriages, and Deaths in Scotland.'
2. Dr. Alcorn, 'On Excess of Population, and on Emigration as a Remedy, especially in Reference to the Highlands and Islands of Scotland.'
3. Mr. Leatham, 'Statement relative to the Bill Circulation of Great Britain and Ireland.'
4. Mr. Bentley, 'On the State of Education and the State of Crime in England and Scotland (Counties in England contrasted with each other).'

[The statistical papers run to such considerable length, that we are necessitated to select such as suit our space, not in the least attending to order or importance: those reserved will appear in future numbers.]

Professor Ramsay, in the absence of Dr. Alcorn, read a paper by that gentleman, 'On Excess of Population, and on Emigration as a Remedy, especially in reference to the Highlands of Scotland.'

Mr. Leatham, a banker from Yorkshire, delivered a most important 'Statement on the Amount of Bill Circulation in Great Britain and Ireland' (No. 3). The subject of the currency, he observed, was one of very great importance, and it was in a state of great darkness; this was not to be wondered at, when men had never taken into account an element greater by four times than all the rest which it involved—he meant the bill currency. Some years ago, a friend and himself were sorry to see disappear from circulation the small bills of exchange, because they considered that, next to gold, these bills were the soundest part of the currency, as they were drawn for a limited period, and upon bankers. They had since got a return, moved for in the House of Commons, of the number of stamps issued during a given number of years, with a view to shew the falling off in the revenue, in consequence of the duty which had been laid on stamps. The subject had been lost sight of; but the thought struck him that one good thing could be got out of it; they could ascertain the amount of the bill circulation of the country. For this purpose he took into consideration the sums which the stamps issued would bear, and, in doing so, fixed upon the medium; for, suppose a stamp allowed an advance of 50*l.* on a bill, he took it at half the amount. He happened, when in conversation with Lord Lansdowne on the subject, to mention the extent of our bill circulation, and he observed that he was perfectly ashamed of himself; for he had been talking of the currency all his life, and had always left out of view that most important item the bill currency. Mr. L. then proceeded to state, that he got Lord Morpeth to move for a return of the number of stamps for five years, from 1835 to 1839 inclusive. Having got this return, he took the medium amount which the stamps would carry; his next inquiry was, What was the mean average date of the bills? and he found them, by a

reference to his own book, to be three months. He went to London and made inquiry of some of the principal brokers, and found that three months with them also was the average date of the bills. He then took the whole stamps for a year, and divided them by four, which gave him the amount of the bill stamps circulated at one time. His next step was to get at the foreign bills circulated in this country, and he found that they amounted to one-fifth of our own; but, to be under the mark, he took it at one-sixth. Mr. Leatham then read from a Table an account of the sums created by bill stamps for Great Britain in the years 1815, 1824, 1825, and the last half-year of 1826, and first half-year of 1827; also the sums created by Irish and foreign bills; and the amount in circulation at one time during the same years. The following is the total amount of these bills in circulation during the years mentioned:—

1815	£649,921,163
1824	316,362,788
1825	354,405,293
Last half of 1826, and first half of 1827	282,222,305

Average Amount out at one time.

1815	£162,480,290
1824	79,090,695
1825	88,601,323
Last half of 1826, and first half of 1827	70,555,576

The following is the Total Amount in Circulation during the following Five Years.

1835	£405,403,051
1836	485,943,473
1837	455,084,445
1838	465,504,041
1839	528,493,842

Average Amount out at one time.

1835	£101,350,762
1836	121,485,868
1837	113,771,111
1838	116,376,000
1839	132,123,460.

Mr. L. then proceeded to make a variety of remarks on the importance of a well-regulated currency, and observed that the great fault hitherto had been that the currency question was chiefly treated by theoretical and not by practical men.

The Chairman proposed thanks to Mr. Leatham for the invaluable statements he had made, and expressed his astonishment at the amount of bill circulation, which, upon evidence incontrovertible, he had shewn was in existence. It was a thing of which he had no conception. A valuable discussion followed, and the thanks of the Section were given to Mr. Leatham.

SECTION G.—*Mechanics.*
Papers and Communications.

1. Mr. Dick, 'On an Improved Railway Wheel.'
2. Mr. Jeffrey, 'A New Hydraulic Apparatus.'
3. Mr. Smith, 'Drainage of Railway Embankments and Slopes.'
4. Mr. Russell, 'Additional Observations on Proportion of Power to Tonnage in Sea-going Steamers.'
5. Mr. Mallet, 'On the Action of Air and Water on Iron.'
6. Mr. Grimes, 'On Dunnet's Rockets for Preserving Lives in case of Shipwreck.'
7. Dr. Wallace, 'On Arches.'
8. Mr. Alexander, 'On an Electro-Magnetic Telegraph.'
9. Mr. Hawkins, 'On Rengeley's Safety Rotative Railway.'

Sir John Robison in the chair.—Mr. Dick read a paper 'On a New Railway Wheel,' which was illustrated by diagrams. It may be made of cast or wrought iron, and the channels are filled with wood; its advantages are, that it works much easier than those commonly in use, is less expensive, and can be easily repaired. It had been in operation for some time on the St. Helen's Railway, bearing daily five tons in weight, and was positively in better order than it was on the first day it was brought into operation. On the Kingston and Dublin Railway the sleepers were originally composed of granite, but the tremulous motion was so great that they had to be changed to wood; now, had this wheel been in use, all this disagreeable motion complained of would have been obviated, and a large expenditure saved. It worked remarkably smooth, especially in wet weather, and the fastenings of the sleepers were not so much worn as by the present wheels.

Mr. Jeffrey called the attention of the Section to 'A New Hydraulic Apparatus.' Its principal properties were simplicity and cheapness; and each of the buckets employed would carry one hundred weight and a half of water. His attention had been called to the subject from observing the clumsy mode in which water was drawn, for the purpose of irrigation, in certain districts of India. Mr. Smith, of Deanston, observed that it was a decided improvement upon the old plan of the chain-bucket.

Mr. Smith, of Deanston, then submitted to the Section a new and improved mode of 'Draining Railway Slopes and Embankments.'

Mr. Scott Russell read an interesting paper, with explanatory deductions, being 'Observations on the Proportion of Steam-power Tonnage;' these were additional observations to those contained in a paper on the same subject, which had been submitted to last meeting of the Association. His object was to define the exact proportion of power to tonnage, which would be most economical in a sea-going steamer from the one end of the year to the other. The result was reached by taking the average, and allowing for the time consumed by favourable voyages in good weather, and bad voyages in rough weather. He found that large vessels, reckoning for a whole year, consumed in proportion a less quantity of fuel than those which were smaller; this was an extraordinary result, considering the velocity of large steamers, and the disadvantages under which they laboured in bad weather. The rule to obtain the best proportion of power to tonnage in a given vessel was this:—Suppose they should know the distance between a port in this country and a certain port in America, and that a vessel took so much time, and consumed a certain quantity of fuel in making the voyage in good weather, and took another period of time and a different quantity of fuel in bad weather. Then, having ascertained these, from the square of the velocity of this vessel in good weather subtract the square of the velocity of the same vessel in the worst weather, divide the difference of these two by the square of the velocity in good weather, and the quotient, being multiplied into double the horses' power of the said vessel, will give the power requisite to propel her in the same circumstances with the smallest quantity of fuel. "Let us take," said he, "a transatlantic steamer, with 1 horse power to 4 tons—her bad voyage being 22 days, and her good 14 days; if we were about to build such a vessel, should we continue at the rate of 1 horse power to 4 tons, or should we alter it? Suppose her to be of 500 tons of actual horse power, then should we increase or diminish it? The rule I have laid down would say that her power ought to be increased in the proportion of 12 to 10, or 6 to 5: that is to say, the engines of 500 horse power ought to be made of 600. By adding the hundred the following results will follow:—The vessel of less power, by this formula, will burn 30 tons of coal per day, and in good weather do the distance in 14 days, burning in all 420 tons of coal. Her bad-weather voyage will be 22 days, burning 660 tons of coal—still at 30 tons a-day. The vessel of greater power would burn 36 tons of coal per day, and make her voyage in 12½ days, burning in all 468 tons. This was a loss of 48 tons at first sight; but it was only an apparent loss. For let us come to the adverse weather, and instead of taking 22 days to complete her voyage, she will do it in 17½ days, burning 630 tons of coal; so that in this view of the case she gains 4½ days in point of speed, and burns 30 tons less of coal than the vessel of 100 tons less power. But then it may be said, that this is only one voyage, and this vessel will have more coal in the year than the other. They must, however, remember that no one knew when the bad weather would come, and she must always carry a quantity of coal prepared for it." Mr. R. then reasoned at some length in favour of his views from the deductions he had laid down. Mr. Fairbairn spoke briefly on the point. He had been in the Mediterranean last year, and was sorry to see the English vessels so much deficient in power. The French steamer passed them by two miles an hour. He was an advocate for increased power. After a few further remarks the subject dropped.

Mr. Mallet gave in some explanation 'On the Action of Air and Water on Iron.'

Mr. Vignoles read a paper by Mr. Grimes, 'On Dunnet's Rockets for Preserving Lives in Case of Shipwreck.'

Dr. Wallace read a paper 'On Arches,' with explanatory drawings.

Mr. Alexander explained to the Section his 'Electro-Magnetic Telegraph,' exhibited in the Model Room, and which we examined with much interest.

It is intended to illustrate, in the most simple and distinct manner, the plan published by Mr. Alexander in May 1837, for "An Instantaneous Telegraphic Communication betwixt Edinburgh and London, by means of Electric or Voltaic Currents transmitted through Metallic Conductors under ground." The plan is proposed to be carried into execution by the application of certain well-established scientific principles, viz. 1st. That the magnetic needle, when supported in such a manner as to allow it to have entire freedom of motion in a horizontal plane (as is the case in the common mariner's compass), tends to assume a position directed nearly north and south. 2d. That if a metallic wire, having one end attached to one of the poles of a voltaic battery, be placed in a certain position near the magnetic needle, the latter ceases to point north and south, and deflects or turns towards the east or west the instant that the other end of the wire is connected with the other pole of the battery. 3d. That although the wire uniting the two poles of the battery be many miles in length, the electric or voltaic current is transmitted instantaneously through the whole length of the wire. The model is contained in a mahogany case or frame, six feet long, two feet wide, and three and a half feet high. The end of the case, intended to face the north, is composed of a wooden board or tablet coloured black, with the twenty-six letters of the alphabet, a comma, a semicolon, a full point, and an asterisk, shewn on white enamel, at equal distances, in six rows or tiers. The tablet is protected by a sheet of plate-glass, and the top or lid of the case is also of glass, for more easy inspection of the interior. Behind the tablet are placed (also in six rows, or tiers) thirty steel magnets, about two inches long, poised on their centres, so as to admit of their assuming their natural position in the magnetic meridian, and thus having their north poles pointed to the back of the tablet. On the

north pole of each of the thirty magnets a small piece of brass wire is fixed, protruding through a slit or aperture in the tablet; and from the point of this brass wire a thin piece of brass, of about one half-inch square, coloured black outside, is suspended. Each of these thirty pieces of brass, when the needles are in their natural direction of north and south, conceal or veil one of the letters or points marked on the tablet; and, in this position, the observer of the tablet perceives nothing but one uniform black surface. Each of the magnets is poised within a coil of several convolutions of copper-wire, and a galvanometer is thus formed. At the other, or south end of the model, is a horizontal line of thirty wooden keys, resembling the keys of a pianoforte, and on these keys are marked the twenty-six letters of the alphabet, a comma, a semicolon, a full point, and asterisk, in the same manner as on the tablet. Thirty insulated copper wires traverse the model from the keys to the galvanometers, with both of which they are connected. Each galvanometer is also connected by an insulated wire, about three inches in length, with a transverse copper rod, extending from one side of the model to the other. There are six such transverse rods placed horizontally, and at right angles with the six rows, or tiers, of galvanometers. These copper rods are connected by wires with each other; and a thick copper wire traverses the model from the undermost rod to the south end of the model, and is there connected with the copper plate, or positive pole, of a small galvanic battery. In a small trough, or reservoir, extending under the whole length of the line of keys, a small quantity of mercury is deposited; and the zinc plate, or negative pole, of the galvanic battery is connected by a wire with the mercury in the trough. It must be here noticed that the two poles of the galvanic battery are thus connected together by the wires and metallic conductors above described, except in the space that intervenes between the keys and the trough of mercury placed beneath them. It has therefore, in the next place, to be remarked, that thirty pendant platinum wires are attached to the under part of the thirty keys of the model, and that when any key is pressed down with the finger, the pendant platinum wire is immersed in the mercury, and the galvanic circuit, by means of metallic conductors between the two poles (copper and zinc) of the battery completed. The instantaneous effect of the galvanic circuit being so completed, is to cause one of the magnets to deflect towards the west, carrying the small brass veil along with it, and thereby exhibiting on the tablet the same letter of the alphabet, or point, that is marked on the key pressed down. When the finger is taken off the key, it rises, by means of a spring underneath, to its former position on a level with the other keys; and the pendant platinum wire ceasing to be dipped in the mercury, the galvanic circuit is again broken, and the magnet returns to its natural position, and veils the letter that was shewn on the tablet. Hence it follows, that by simply pressing down with the finger any of the keys (precisely in the same manner as the keys of a pianoforte are touched), the same letter that is marked on the key is shewn on the tablet for a sufficient length of time to allow it to be observed by any person watching the motions of the veils on the tablet; and words are thus communicated in rapid succession from the one terminus of the telegraph to the other. When, in the course of a communication, it is wished to indicate a comma, semicolon, or full period, these will be disclosed on the tablet, on the corresponding key being pressed down; and in order to indicate that the spelling of a word is finished, the key marked with the asterisk may be pressed down, and the asterisk being at the same instant exhibited on the tablet, will shew the observer that the word is completed, and that a new one is about to be spelled. In order either to send or receive a communication by a telegraph of the simple construction proposed, no greater learning would be required than is necessary in reading a common book; and the rapidity with which a communication could be made would be as great as that with which most persons are able to write, or as a compositor is able to set up types. In telegraphing between distant points, the connecting wires would be made to traverse the intermediate space through a tube of wood, or some other material that would protect the wires from external injury; and the wires would of course be separated from each other, by laying them in separate grooves in the tube, or by coating them with some non-conducting substance. The diameter of the tube might be very small; and in order to protect the wires from any atmospheric influence, and the tube itself from violence, it would be best placed under ground. Following out the scientific principles that have been explained, and taking advantage of the mechanical contrivances illustrated by the model, it appears perfectly practicable to the inventor to construct an electro-magnetic telegraph, surpassing all other kinds of telegraphs in respect to the rapidity, facility, and certainty with which every species of communication can be made between points however distant.*

Mr. Hawkins detailed 'Mr. Rengeley's New Plan of the Safety Rotative Railway,' in which the wheels are proposed to be transferred from the carriage to the road, and the train to be moved by the revolution of the wheels, of which there will be 1760 upon the mile.

FRIDAY.—Section F.

Dr. Alison proceeded to his 'Illustrations of the Practical Operation of the Scottish System of the Management of the Poor;' but we found it impossible to hear and follow him distinctly, and are, therefore, obliged to the local press for this sketch, which seems to be correct. He was well aware of the restrictions which had been imposed on the discussion of the subject; but he would confine himself to the numerical part of it, which could be properly brought under the notice of the Section. He might remark that the Scottish law differed from the poor-laws not only of England, but, he might say, of almost every country in Europe, in so far as the former was rarely obeyed, while the latter were strictly enforced. By the letter of the Scottish law, the ministers, heritors, or magistrates of burghs, were required to make provision for the poor and to tax the inhabitants for the purpose; but he need not say that the spirit of the law was not carried into effect in any part of Scotland, nor was there any attempt to do so: on the contrary, the relief was small, and found to vary from one halfpenny to 3*s*. 6*d*. per week. The cause of this was the peculiarity in the Scotch law, by which the persons, or their representatives, who were called on to pay the tax, had at the same time the power of fixing the amount of funds to be raised, and from their resolutions it might be said that there was no appeal. It should be stated that the reason why the practice was so much at variance with the law was the belief, on the part of the heritors and others, of the great and formidably evils which would be connected with the proper execution of the law, and therefore the police of only resorting to it in cases of dire emergency. This opinion rested upon two grounds: first, upon its effect on the numbers of the poor; and, second, upon their character. First, it was presumed that if a fixed provision were made for the poor, it would have the effect of vastly increasing their numbers; and, secondly, it would destroy the feeling of independence of those who received it. But it was plain that the *onus probandi* rested with those who did not obey the law; for those arguments would apply equally well to private charity, which would have the same tendency as that attributed to the legal provision. Now, many facts might be quoted to prove that the Scotch system had not had any beneficial effect in decreasing the numbers of the poor; but that, on the contrary, they pressed upon the means of subsistence, and endured privations as painful to human life, as was the case in any country in Europe, where the relief of the poor had law in its favour. Even in country districts this was the case to a considerable degree; but that it was not the case more extensively might be attributed to the residence of landed proprietors who took an interest in the poor, and for the permanence of which there could be, of course, no security; and, second, to the proximity of large towns, where there was an extensive demand for labour, and more charitable assistance. It was only, therefore, by looking into the state of the large towns that the condition of the poor could be duly estimated. It was not the case, as had been more than once stated, that poor families in removing from the country at once became paupers; they came more generally in search of work; but they came in much greater numbers than were needed, and frequently they were partially disabled; and should they afterwards fail to procure employment, or lose it, or become unable to work, they did not return, but almost universally remained to swell the list of those who subsisted by charity. The learned doctor then produced a lengthened body of statistical facts in support of his position, and to prove the vast extent to which the charities of Edinburgh were burdened, not by the poor who claimed that locality as the place of their nativity, but by others who had taken up their residence there in after-life. This was the case, too, in Aberdeen, Dumfries, Dundee, Glasgow, &c.; and in reference to the latter place mentioned, Dr. Perry had stated that only fifteen per cent of those who were admitted to the fever hospital were natives of the city. On the subject of vagrancy, Dr. Alison remarked that it had been a pretty general statement, that the number of vagrants who issued from the towns in summer and spread themselves over the country might be held to compensate for the poor who left the country parishes and took refuge in the cities; but in reply to this, if it were inquired into, it would be found that a very small portion of these vagrants belonged to the towns in which they had taken up their residence. It was no argument to say that many of these persons were of bad character; that which concerned them was not the character of these persons, but that the evil of vagrancy and destitution existed to an excess. The learned gentleman then detailed to the meeting the result of a number of queries which he had addressed to twenty-eight gentlemen in Edinburgh, consisting of ministers, elders, lay visitors, &c.; in a town, be it understood, which was not the seat of a manu-

* The model is substantially the same as was exhibited before the Society of Arts in Edinburgh three years ago, and gained the honorary medal of that Society.

facturing population, and where, of course, there was little fluctuation. These queries had reference to the state of the poor in various districts of the city, and the replies in every case spoke to the appalling destitution which existed amongst them. In scarcely any case had they permanent employment, and even when employed, their earnings amounted to a perfect pittance; every thing they possessed, whether of clothing or furniture, went to the pawnbroker, until they had nothing left to pawn, and then they were left on the very brink of starvation. Intemperance was proved to have a very small share in causing this wretchedness; it rather arose from circumstances over which the poor had themselves no control, such as age, sickness, want of employment, and the like: and it was further proved, that those who suffered most severely were single females, or widows with orphans, who rarely earned more than from 6*d*. to 9*d*. per day in summer, and in winter could not find employment on any terms. The sufferings of this class were said to be such as almost to exceed belief; for months their food was scanty, and one of the ministers stated, that he had known instances of their attending sermon forenoon and afternoon without having broken their fast. Many of them consisted of labourers and decayed tradesmen, who had been unable, even when they could work, to save a shilling, however anxious and temperate they might be; indeed, such was their hard lot, that they had been known to work, when they could procure it, up till within a day or two of their death. Yet these were persons who rarely received any assistance whatever from the poor's funds, and it was a fact worth noting, that this wretched class were most frequently assisted by persons nearly as destitute as themselves. To take one instance, where fifty might be given: there was a close in the Cowgate of Edinburgh where forty-eight families resided, consisting of 158 persons. Of this forty-eight, there were ten widows who did not earn, even when employed, more upon an average than 2*s*. 6*d*. a-week; the larger portion of them had only occasional employment; few of them had permanent employment, and some of the men did not earn more than 3*s*. 6*d*. by their labours. Their furniture was scanty in the extreme, and sixteen of them had neither furniture nor bedding at all: out of the whole number not more than five could be stated to be of intemperate habits. Of the very small number who received aid from the parish, the allowance did not amount to more than 5*d*. per week. A widow with only one child did not receive any thing. Under these circumstances the poor were huddled together in great numbers in a single apartment; wretchedness banished every feeling of self-respect,—step by step they sunk into the depths of wretchedness and demoralisation; their lean, ill-fed condition rendered them an easy prey to fever, which scarcely ever left them, and their condition altogether was such as to excite alarm in the minds of all. Dr. Alison, at considerable length, endeavoured to prove that fever and disease were, more than any thing else, the consequence of destitution; and that wholesome food, even with want of cleanliness, was much more likely to resist its aggressions than poverty with fresh air and cleanliness. Under these circumstances it was his conviction, that any inquiry into the sanatory condition of the people which did not also include an inquiry into the nature of the provision for the poor, would fail in its proper object. He would recommend an increased provision for the poor, both to alleviate their sufferings, and for the sake of the other portions of the community. Were such provision given, many of the poor who now burrowed in the large towns would remove to their proper places of settlement. In the cases of destitution for want of employment the workhouse might keep them from starvation, and, should they take fever, they would b eprevented from communicating it to others. Ireland had suffered bitterly; Scotland had also suffered much—both infinitely more than England; and he could not doubt that an increased provision for the poor was the only means, under Providence, for alleviating the evil. It had been said that, increase the provision and you increase the evil; but it had subsisted in England for 200 years, and fever amongst the poor there was comparatively rare and light as compared with its ravages in Ireland and Scotland.

A brief discussion followed, in which Mr. Wishaw, Dr. Hannah, and other gentlemen, took part. Dr. A. explained that the assessment was different in different towns. In Edinburgh it was six per cent upon the rental; but the members of the College of Justice were exempt. If the heritors should decline to impose an assessment, the sheriff had no power to interfere; the Court of Session alone could enforce it, and an appeal to this court involved a ruinous expense.

The Lord-Provost's and Magistrates' Dinner went off with great *éclat*. About 200 of the leading members of the Association dined in the Town Hall, the Lord-Provost in the chair.—On either side were the Duke of St. Alban's, the Marquess of Breadalbane, the Marquess of Northampton, Lord Monteagle, Lord Greenock, Lord Belhaven, Lord Sandon, Sir J. Robison, General Tscheffkine, Count de Lisle, Principal Macfarlane, M. Agassiz, and Mr. Murchison; whilst the Croupier (Bailie Small) was supported by Sir D. Brewster, Enke the famous astronomer, Sir T. M. Brisbane, Mr. Airy the Astronomer Royal, Dr. Buckland, and other distinguished men. But it is unnecessary to particularise the upper and lower tables; all the ranges between boasted a crowd of eminent individuals, both native and foreign. Mr. M. Lockhart, the county member, Mr. Denistoun, one of the members for Glasgow, Sir J. Rennie, Mr. Vigors, M. Jacobi, M. Benchhausen, the consul-general of Russia, Professor Johnston, Mr. Wood, Mr. Colquhoun, and, in short, a roomfull of the principal persons who have adorned this meeting. Turtle, venison, champagne, &c. &c., bore witness to the municipal hospitality of Glasgow; and twenty-two toasts called up some fifty speakers, who, in various ways and on various subjects, contribnted much to the enjoyment of the day. The Lord-Provost performed the duties of the chair with great ability; and we may truly say that the British Association never concluded a meeting with a more harmonious, brilliant, and triumphant entertainment. Some of the facts and sentiments enounced on the occasion well deserve a record; and we shall endeavour to give it to them in a future number.

REVIEWS OF NEW BOOKS.

The Clandestine Marriage, and The Sisters. By Ellen Wallace. 3 vols. 12mo. London, 1840. Bentley.

We shall be particularly careful what we say of these tales, for we are placed by their fair authoress in "a peculiar position" as a critic of the male gender. After amusing ourselves with two very readable volumes, containing lively sketches of female character, and, if deficient in what may strictly be called plot, certainly not failing in interest, we arrived at the end of the first tale; and, behold! we found ourselves like some trespasser in a fair domain, abounding with serpentine walks, flowery parterres, and umbrageous shrubberies, who suddenly comes on a notice couched in the plainest terms,—"No dogs or strangers admitted." Well, we had had our walk, and we felt so little remorse at the trespass, that, taking *The Sisters* for our guide, we reached the end of the third volume. But we put it to any one whether we were not bold in the adventure after such a warning off the property as the following?—"I wrote this book for young women—*it is not likely to interest men; I hope they will not read it*, since it bears no reference to their feelings or pursuits." But we *have* read your book, Miss Wallace, and though we agree with you that it is not a gentleman's book, we can assure gentlemen that they may safely place it in the hands of their female relatives, as containing several goodly warnings to the ladies of the creation. Here is a scene which a self-willed girl, the heroine of the first story, *The Clandestine Marriage*, enacts with a gentleman who has no small share in the narrative. Miss Fanny has made up her mind to take him to a little island on a lake, and, like most young ladies we know, she will have her own way:—

"'I won't be scolded, sir!' said Fanny. 'I am going to row you to the island.' 'I shall not let you row,' said Mr. Mapleton, taking up the oars; 'you are a great deal too old. Besides I don't choose to let you spoil those pretty little hands with such hard work.' 'I will row!' said Fanny, as they stepped into the boat; 'so give me the oars.' 'No,' said Mr. Mapleton, who delighted sometimes to tease her. 'Give me one,' said she, stretching out her hands. He pretended not to hear her, and began to fix them in the rowlocks. 'Then look what I will do!' cried Fanny; and springing up, she stood on the edge of the boat so as almost to upset it: 'I'll swamp the boat if you don't give me an oar!' 'There, then! you little vixen!' said he. Fanny evinced her gratitude by splashing her companion all over, as soon as she got the oar in her hand. They reached the island, and sat down in the thicket of shrubs. 'Well, now,' said Mr. Mapleton, 'how have you spent your time while I have been away? How goes on Virgil? and what do you think of Niebuhr, whom I left you reading?' 'Why,' said Fanny, 'the very day you left, Mrs. Griffiths called—you know Mrs. Griffiths?—she lives in the white cottage just under the hill, on your road to Copsley.' 'And what may she have to do with Virgil?' 'Oh, I am coming to him by and by. She called to say that she had a peacock which did her a world of mischief; scratched up her flowers—you know how fond she is of flowers—' 'Well.' 'Well, but only think! she came to give her peacock to me; that is if I liked it. Oh, I did covet a peacock! So I ran out, and she had it packed in her carriage, in a basket with a lid; a great basket, but its tail was so squeezed! I promise you it screamed when we took it out; and now it knows me very well, and I feed it every day. I'll let you feed it to-morrow.' 'Thank you.' 'And you will be very much surprised to hear how easily I can read Virgil; but I very soon left off reading Niebuhr.' 'Why?' 'Because he contradicts all the nice old tales which I used to believe and delight in. He has made history so stupid.' 'But what if his account be the

true one?' 'Even then, I had rather not know it. There is no charm in ugly truth. Besides, he often contradicts the old story without putting another in its place. Now, something must have happened all that while; and I had rather accept the tradition, than believe the world went to sleep in the interim.' 'But for what purpose do you read history?' 'Oh, that is such a tiresome question; and I know you want me to say, 'To learn the true state of things in other times,' so I shall not say it; and, moreover, I will not read any more of Niebuhr.' Mr. Mapleton, laughed, and promised to send her 'The Seven Champions of Christendom,' since she was so partial to fictitious narrative. Upon this, Fanny very quietly inserted a bunch of tall grasses, that she had gathered, into Mr. Mapleton's crape hatband; and as he had begun an eloquent panegyric of St. George and the Dragon, he remained unconscious of the honour conferred on him, till he caught a view of his nodding plumes in the water that wound close to the spot where they sat, so he strewed the grass upon Fanny's bright hair, and she threw it back again, laughing and scolding until she was out of breath. 'I don't know how it is,' said Fanny after a pause,—a grave pause, such as often succeeds to a fit of high spirits; 'but when I am with you, I never think about your being such a great barrister as people say you are, but I just say all the nonsense that comes into my head, and when you are gone I wonder at myself.' 'And when I am with you, little witch, I forget all about the courts and tedious cases, and only wish I could scramble about the hills all day long with you, and be a great many years younger, and then——' 'Oh! why younger?' said Fanny. He looked confused, actually. 'Oh! tell me, does nature become less beautiful, less dear to us, as we grow older?' said she, eagerly. 'To some it does,' he replied. 'Men become so engrossed with things of art, that there is no room in the mind for any thing else. The struggle for power or gain so utterly absorbs our faculties.' 'Oh, don't speak as if this was the case with you,' said Fanny. 'Not now,' said he; 'but it has been, for so many years, time wasted, as all time so spent must be.' He seemed deep in thought: Fanny sat silently by him for some time. 'I should so like to ask you one thing,' at last she said. He turned to her with his kind smile. 'Do you find much good in human nature; much in proportion to the ill? It seems to me, who know nothing of life, that there is so little good, even in those people I know, except you and papa, and aunt Parr.' 'You are very young to have come to that conclusion,' said he. 'Young people generally set out in life with an exaggerated idea of the excellence of those persons with whom they come in contact,—that is all the world to them. But many years do not elapse before they meet with some incident that seems to shake the ground under their feet, some utter breach of confidence where they most trusted, or some disclosure of unworthiness that for a time embitters their feelings towards their fellow-creatures. That has been my fate, and, I believe, is the lot of many others. But a further acquaintance with man teaches us that the human character is indeed a 'mingled yarn, of good and ill together,' and that few persons exist whose defects are not largely tempered with amiable or sterling qualities. And time teaches us to look with a lenient eye upon faults from which none are exempt, and to submit to the conditions of our humanity the more readily, as we find that our own deficiencies are hard to overcome.' 'You must see the worst side of human nature?' said Fanny. 'Very often; the best side sometimes, though, as you shall acknowledge. I will tell you an anecdote I heard a little while ago from a solicitor with whom I am intimate. A young man lately came into the possession of a large estate and fortune—immense, I believe. He had one brother, two or three years younger than himself, who was deformed and sickly. I understand he had always been a neglected child; and as soon as he was old enough, he had been placed in a banker's house; for he had actually nothing, the estates being so rigidly entailed upon the elder son. Well, this deformed youth pined and fretted in the confinement of his new employment, and grew morose and bitter, in the feeling that no one loved or cared for him. His brother was on his travels, and they hardly knew each other by sight. The father dying, the brother was called home to take possession of his great property. As soon as the eldest son reached England, he went to his solicitor, and inquired about his brother, declaring that he was anxious to make over to him all the funded property that was at his own disposal; for that he should then be left rich beyond his desires, and he could not endure that his brother should be engaged in a profession directly opposed to his tastes and his state of health. It was so very large a sum, that the solicitor begged him to pause, to take time, before he decided; but he would not hear of a moment's delay; and as soon as the parchments could be written he set off with the solicitor to his brother's lodgings. They had not met for years.' 'Oh! tell me every word about this.' 'The deformed youth received his brother very coldly at first; but when he spoke to him with so much kindness, he seemed at first surprised, and then very much affected.' 'And when his brother told him of the fortune?' 'He fainted.' 'Oh! but you have not told me half. I want to hear all the particulars.' 'I was not present, and I only heard the outline I have given you.' 'And did you not ask your friend?' 'No. He would have thought me half mad to ask for particulars; or he would have fancied that I meant to write a romance about it.' 'And you know nothing more?' 'Only the name of the man who gave away his money.' 'And that is ——' 'There is the dressing-bell,' said Mr. Mapleton, rising. 'I suppose you mean to make a very fine toilet to-day,' said Fanny, 'you seem in such a hurry. Now, do oblige me by not wearing a red velvet waistcoat; I do not care how gentlemen dress, so that they keep clear of red waistcoats. Now, I'll tell you what I mean to wear. A white muslin dress, worked all up the front and round the skirt as deep as that!' (measuring the distance on the border of her silk apron), 'and trimmed with pale blue riband. I wore it once before at a juvenile ball that Mrs. Griffiths gave. People said that I looked exceedingly well in it.' 'You conceited little creature!' said Mr. Mapleton. Fanny seemed to take no notice of this remark, and they went to the boat, which they had left moored in a little creek (if it deserved the name), and fastened to the root of an old oak with a bit of rope. Mr. Mapleton began to untie it. 'Come, make haste, oh! do,' cried Fanny,—'be quick, Mr. Mapleton; I mean to take at least an hour dressing. I do think you are going stone-blind! I'll get you a pair of spectacles when we go in. I know the housekeeper has two pair—she can spare you one. That 's not the way! oh! do be quick!' 'Don't, child! you fidget me,' said Mr. Mapleton. This was exactly what Fanny wished to do. As soon as the knot was undone, she watched the right moment, and, with a sudden stroke of one of the oars, she pushed the boat fairly into the stream. It floated fast into the middle of the water—far—farther—quite out of their reach. Well, this is very diverting,' said Mr. Mapleton, watching their receding bark. 'Now, what could induce you, you provoking child! to play me such a trick?' 'Why, I'll tell you,' said Fanny, looking very important; 'people say that you are a very wonderful barrister, and that you can turn and twist a matter this way and that way, and any way but the right: so I wished to see what you would do on any great emergency; and now here is one to try your powers upon. See if you can conjure us two to the other side of the water!'"

Referring the curious to the work, as to how they *did* get off the island, premising that it was not by conjuration however, we again commend these tales to all young lady readers.

MISCELLANEOUS.

Tyas's Legal Hand-Book: The Law of Bills of Exchange and Promissory Notes. By a Barrister. Pp. 100. London, 1840. Tyas; Hastings.

VERY useful, we are bound to presume, and a good compendium of the laws as applicable to all incidents and cases connected with these securities. We would, however, venture a piece or two of advice (gratis, and not inferior in value to these 100 pages), viz. to have as little as possible to do with their subjects, and to avoid the "Law" of them altogether.

The Afflicted's Refuge. Pp. 146. (Edinburgh, Johnstone.)—Prayers for periods of human distress, where only one Refuge can be satisfactorily appealed to.

1. *Optical Questions.* By A. M. Pp. 86.
2. *A New and Literal Translation of the First Book of Herodotus.* By Philomenes. Pp. 216.
3. *An Elementary Treatise on Mechanics.* By J. Pendulum. Pp. 107.
4. *Luby's Elements of Geometry, &c.* A new edition. (Dublin, J. J. Ekins.)

These publications, principally intended for the undergraduates of Dublin University, are not undeserving of more extended use. As class-books, analytically arranged, they are well calculated to facilitate and improve the process of instruction. Mr. Luby's volume was originally noticed by us in those terms which made us look with confidence to its reaching new editions.

ARTS AND SCIENCES.

BOTANICAL SOCIETY.

FRIDAY, September 4. Mr. D. Cooper, Curator, in the chair.—Announced, a donation of a series of plants from Natal, Southern Africa, comprising upwards of 350 species, collected and presented by Dr. F. Krauss.—Exhibited, by the Chairman, specimens of *Aspidium cristatum*, collected by Mr. S. P. Woodward in July last, by the side of a drain at Fretton Broad, Suffolk; by Mr. T. Sanson, specimens of *Hypnum rugulosum* and *Bryum affine*, from Mr. F. K. Eagle, and first discovered by him at Mildenhall, Suffolk. Also, a specimen of *Schystega pennata*, found by the Rev. C. A. Johns, at Helston, Cornwall. Read, a paper by Mr. T. Sanson, 'On a Monstrosity of *Polytrichum commune*,' which exhibited the union of two calyptræ.

Friday, 2d October. Mr. J. E. Gray, President, in the chair.—Specimens of *Aspidium cristatum*, collected on Edgefield Heath, near Holt, Norfolk, were submitted for inspection.—A paper by Mr. Wallis, 'On the Flora of Essex,' was read. A former communication described the *Orchideæ* of Essex, the present embraces the *Ranunculaceæ*, &c.; and Mr. Wallis intends, by a series from time to time, to elu-

cidate the flora of the county. The descriptive remarks were clear and concise: the series will be an acquisition, and well worthy of imitation and extension to other counties and localities.

PARIS LETTER.

Academy of Sciences, Sept. 29, 1840.

SITTING of Sept. 21.—M. Breschet communicated to the Academy some interesting results of experiments 'On the Transmissibility of Hydrophobia and Canine Madness to the Human Species, and to all other Mammiferæ.' He considered it of importance to distinguish carefully between hydrophobia and canine madness, because the former was a symptom of various fevers, and was not necessarily attended by death; whereas the other was always fatal, but was not always accompanied by hydrophobic symptoms. He had inoculated a dog with the saliva of a patient who died of canine madness, and the animal went raving mad and died. Dogs had bitten, while in a state of madness, asses and horses; and these latter animals had shewn all the symptoms of the same disease, though the horse was not so much affected as the ass. It had been observed by him, that by successively inoculating dogs with the virulent saliva, one from the other, the disease gradually lost its intensity; as, also, that the blood of a rabid dog injected into the blood of one in a sound state of health, had even produced madness. Rabbits and other small animals, as well as birds of various kinds, had been inoculated by M. Magendie and himself with the saliva of a rabid dog, but they shewed no signs of madness though they *all* died soon after. The period for the rabid symptoms first manifesting themselves after inoculation was from twenty-five to forty days. He had given abundant liquors to a dog in a state of rabid madness, and had even poured them down his throat, the animal shewing no repugnance to it: on the contrary, the dog drank readily.—M. Christol addressed a memoir to the Academy 'On the *Metaxytherium*,' a fossil cetaceous animal of Angers, which, from a mutilated portion of its humerus, Cuvier had considered to be a species of large seal. The metaxytherium might be divided into two species, a smaller and a larger one: the former being found in the upper tertiary marine beds of Montpellier, and the latter in the lower tertiary strata of the Charente, and the Maine et Loire.—A second memoir 'On Planetary Movements' was sent in by M. Cauchy.

Academy of Fine Arts.—M. Caristie, the architect, has been elected a member in the room of the late M. Huyot.

Academy of Inscriptions and Belles Lettres.—This body held its annual public sitting on Friday for the solemn distribution of the prizes, the awarding of which we have already noticed. After the ceremony had been gone through, M. Berger de Xivrey read a memoir 'On the Intercourse between the Emperor Manuel Palæologus and France at the Commencement of the Fifteenth Century;' and M. Magnin communicated an interesting paper 'On the Theatre of the Greeks; on the Management, Scenery, Bills, &c. of their Places of Dramatic Representation.'

RIUNIONE DEGLI SCIENZIATI ITALIANI.

(*Italian Scientific Association.*)

Turin Meeting, Sept. 18, 1840.

1. *Medical Section.*—Five papers were sent in, on the demand of the President, to compete for the prize offered by Professor Franck, for the best memoir upon the continuance or discontinuance of the doctrines of Hippocrates.—The discussion on Dr. Linoli's position of the non-reproduction of organic tissue was continued. Professor Gallo produced two fine pathological preparations from the Museum of Turin to prove that the reproduction was possible. Professor Schinn also adduced facts on the same side. Dr. Ruatti, Professor Botto, and Professor Bianchetti, adopted the views of Dr. Linoli. The President declared himself opposed to the doctrine of the reproductive power, and was followed by Professor Pasero on the same side. Professor Schinn replied, and maintained his former opinion.—Dr. Parola read a paper 'On the Use of Bearded Rye in cases of Bronchites and Phthisis.'—Dr. Nardo expressed a wish that a medico-statistical return should be made to accompany all statistical returns of population, &c.—Dr. Bertolini read a statistical report of the sanatory condition of the prisons of Turin during the last ten years.

2. *Geological Section.*—The discussion on the theory of dolomisation was resumed.—A letter from Professor Agassiz to the Prince de Canino e Musignano, 'On Fossil Fishes,' was read.—A memoir, contributed by the Cavaliere Graberg, of Hemsö, 'On the Recent Advance of Geographical Science,' was communicated to the Section. The Cavaliere Dispine read a memoir 'On the Mineral Deposits of the Sardinian States.'

3. *Physical, Chemical, and Mathematical Section.*—Professor Maiocchi communicated the plan of a scientific journal which he was about to establish.—Professors Configliachi, Magg, Porro, and Dr. Maestin, sent in a notice upon the cases in which the formation of hail takes place in regions of the atmosphere inferior to that in which the temperature is at zero. Professor Belli made some observations on the importance, in all observations made upon hail-storms, of taking account of the time elapsing between the first formation of a cloud and the arrival of the hail-stones at the surface of the earth. Professors Configliachi, Baruffi, Pacinotti, Perego, and Dr. Arella, suggested various methods of examining into the nature of hail-stones, ascertaining their real weight, &c.—Professor Maiocchi sent in a paper 'On a New Electroscope.'—A letter was read from Captain Menabrea, 'On the Importance of Introducing the Theory of Virtual Velocities into all Elementary Works on Mechanics.'—Professor Vismara sent to the Section the result of his observations on a late remarkable thunder-storm at Cremona, and on the good effects of the lightning conductors erected there.

4. *Agronomical and Technological Section.*—A conversation took place on the best method of drying mulberry-leaves for silk-worms, and a commission was appointed to make experiments to that effect.—The Cavaliere Carena presented a packet of carbonised grain, known in Tuscany by the name of *Grano di Certaldo*; and a discussion on its nature ensued.—The Marchese Ridolfi produced a specimen of a poisonous spider, the *Aranea Savi*, found in Tuscany. A memoir 'On the Breeding of Silkworms' was read by Dr. Ormea.

5. *Botanical and Vegeto-Physiological Section.*—Professor Decandolle read two memoirs: one 'On the Monstrosities resulting from Rupture of the Pericarp;' the other, 'On the Euphorbia with White-spotted Leaves.'—Dr. Giovanni Casaretto gave a highly interesting and animated relation of his scientific travels on the coast of Brazil.—Professor Moris communicated some remarks upon the point whether the *Samolus Valerandi*, L., had been introduced into Italy from Brazil, or whether it was indigenous.—Professor Decandolle made some remarks upon the geographical botany of Brazil.

6. *Zoological Section.*—Professor Nardo read a paper 'On the Structure and the Integuments of Fish.'—The Marchese Durazzo communicated a notice supplementary to his catalogue of the birds of Liguria.—The Cavaliere Bellingeri offered to demonstrate some singular facts relative to the anatomy of the frog before a commission named by the President.—Dr. De Filippi presented some specimens of a species of rat common in Lombardy, but not generally known to naturalists. Professor Pictet presented another specimen from Switzerland, and M. Selys Longchamps one from France.—On the motion of Professor Gené, it was decided that a commission should be named to decide what species of *rodentia* existed in the Sardinian States.—Dr. De Filippi presented a specimen of a serpent, which he believed to be distinct from the *Rhinechys Agassizii*.—The President read a memoir 'On the *Falco Eleonoræ* of Gené.'

September 19th.

1. *Medical Section.*—Professor Tiedemann presented the Section with a copy of his work 'On Cowper's Glands.'—The President read a paper of his own, in continuation, of the controversy on the reproduction of animal tissue. He adduced many cases of his own observation, and others from the most celebrated medical authors: he also cited Hunter, Harvey, and other authorities, to prove that inflammation, at a certain point, did produce or reproduce animal tissue.—Professor Patellani produced the brain of an ox which had become petrified: he threw out the suggestion whether animal magnetism, or some powerful affection of the nerves, might not have caused this phenomenon.—Drs. Bianchetti and Pollo returned to the controversy on the reproduction of animal tissue, and adduced instances from the gestation of animals that induced them to differ from the President. Dr. De Michelis, on the contrary, sided with the President.—Dr. Angeline read a paper 'On Egyptian Ophthalmia,' which he considered not to differ in nature from the ophthalmia of other countries, and to be contagious.

2. *Geological Section.*—The Abbate Chamousset communicated some 'Observations on a new Method of treating the Minerals, and especially the Silver, found in Savoy.' He also read a memoir 'On the Formations of Anthracite found in the Micaceous Schists of the same Country.' M. Michelin read to the Section some observations which he had laid before the Geological Society of France relative to the anthracitical deposits of the Alps, and on the calcareous formations associated with them. Professors Sismonda, Balsamo, and Pasini, with the Marchese del Pareto, made observations on these communications.

3. *Physical, Chemical, and Mathematical Section.*—Professor de Cattenei di Momo read a memoir detailing various experiments to shew that calomel is not changed into corrosive sublimate by the action of the alkaline chlorures, which are found in the saliva, or other animal humours. A letter was communicated from Professor Perego, in which he gave an account of the high electric powers acquired by mercury when filtered through different substances.—A discussion on the power of lightning conductors, and the means of improving them, concluded the operations of the day.

4. *Agronomical and Technological Section.*—Professor Moretti gave an historical account of the introduction of the potato into Italy, and

of the actual state of its cultivation. He also read a paper 'On the Importance of a Scientific Agrarian Phraseology in Italy.'—The Conte Villa de Montpascal recommended that an inquiry should be made into the state of the cultivation of the *Murus Multicaulis* in Italy, and particularly in the neighbourhood of Turin. The President approved of the motion, and two committees were named, one to inspect the neighbourhood of the capital, the other to examine the silk manufactories within the city. The President took the opportunity of mentioning, in terms of praise, the offering of a prize of 10,000 francs by the Society for the Promotion of Industry at Oneglia, for the best method of preserving olives from insects.—The Marchese Ridolfi presented to the Section two new species of grapes, of a strong flavour quite peculiar to themselves.

5. *Botanical Section.*—Dr. Trinetti read an elaborate memoir 'On the formation of Odours in Flowers.'—Professor Risso commenced the reading of a paper 'On the Natural History of the Wild Plants of Italy.'

6. *Zoological Section.*—A letter was read from the Marchese Ridolfi, together with a description by Dr. Marchetti, 'On a Species of Toad peculiar to Tuscany, and exceedingly venomous.'—Dr. Nardo communicated some important observations 'On the Cartilaginous Structure of Fishes.'—Professor Pictet, of Geneva, explained to the Section the basis and the plan of a monography, 'On Neuropterous Insects,' about to be published by him.—The Marchese Durazzo presented a fish from the Mediterranean, of a species not yet clearly determined.

September 21.

1. *Medical Section.*—Professor Landi disclosed his plan of an institution for the cure of pulmonary phthisis, and a commission was appointed to report upon it.—Professor Pallys, from Athens, described the maladies endemical in Greece, and gave an eloquent discourse on the benefits conferred on Italy in ancient times by great physicians, as well as the advantages derived by modern Greek practitioners from Italian science.—A discussion took place on the memoir of Dr. Parola, 'On the use of Bearded Rye in Cases of Consumption.' Dr. De Michelis thought that the action of the rye would augment the contractibility of the tissues.

2. *Geological Section.*—M. De Caumont presented a volume of the "Memoir of the Linnean Society of Normandy."—M. Boué presented his Map of the Geology of Europe, and observed that he intended to publish a new edition of it with all the latest additions and corrections. The Marchese Pareto observed that the new map ought to shew that the tertiary formations, limited in the old map by the valley of the Po, traversed the Apennines near Savona, and joined the tertiary formations on the shore of the Ligurian Sea. He also read a memoir 'On the Alternation of Strata with Fluviatile Shells, with the Strata containing Marine Shells of the Tortonese, and other points of Upper Italy,' and presented several specimens illustrative of his researches.—M. Barelli communicated to the Section the materials which he had collected for forming a geologico-mineralogical nomenclature for Italy.—The Intendant-General of the Interior communicated, by the medium of the Baron Hombres Firmas, a description of the method of M. Pactod for treating argentiferous ores used in Sardinia.

3. *Physical, Chemical, and Mathematical Section.*—A commission was named to report on the changes to which calomel was, or was not, liable from animal humours.—The hydraulic engineer, Signor Potenti, read a memoir 'On the Regulation of the Current of the Po,' and contended that scientific and practical knowledge was equally necessary in a work of that description.—A work on "The Hydraulic System of the Po," by the corps of Lombard Engineers, was presented to the Section by Signor Cadolini, one of that body.—Professor Avogadro read a memoir 'On the Laws of Specific Heat in various Substances.'

4. *Agronomical and Technological Section.*—The Marchese Ridolfi read a notice 'On the Compilation of a general Work upon Italian Agriculture.'—Dr. Rosnati read a memoir 'On the *Maclura Auruntiaca*;' and Professor Biasoletto one 'On the Drying of Mulberry Leaves for Silk-worms.'—The Cavaliere Bonafous gave an account of two machines for thrashing Turkey wheat, one of American, the other of Tuscany, invention. To this Professor Milano joined the description of a third, invented in Piedmont.

5. *Botanical Section.*—Professor Risso terminated the reading of his 'Account of the Natural History of the Wild Plants of Italy.'—Dr. Rerlola and Professor Decandolle entered into a discussion on a monstrosity of the *Tragopogon pratense.*—A letter was read from Signor Calamac, of Florence, 'On the Fecundation of Plants.'—Dr. Biasoletto presented a fossil alga, which he thought to be a polysiphonia.

6. *Zoological Section.*—Dr. Garbighetti read a memoir 'On a Skull found in an Etruscan Tomb.'—The Secretary read an extract of a work presented by Professor Tiedemann to the Section, 'On the Comparison of the Skull of a Negro with that of an European,' made by Professor Polli.—The Cavaliere Bellingeri presented some 'Comparative Tables of the Fecundity and the Manner of Living of Birds,' together with a memoir 'On the Proportion of the Sexes among Mammiferæ at Birth.' The Cavaliere shewed some rare varieties of the common snail, and mentioned the methods by which he had obtained a good number of the shells of this species, with a spiral turning to the left.—The Signor Verany described two new pteropodi of the Mediterranean Faunus.

September 22.

This day the members of the Geological Section made an excursion to the hills of Chieri and the Superga, to examine the nature and position of their strata. The members of the Zoological Section joined them in the excursion, in order to discuss any question of natural history which might arise from the fossil remains discovered. Neither of these Sections held sittings.

September 23.

1. *Medical Section.*—Dr. Derolandis read a memoir 'On the Means of Suppressing Mendicancy.'—Dr. Cervetto endeavoured to urge upon the Section the importance of drawing up a new medical history, in the form of a biography.—Dr. Despines explained his views of the manner of forming medico-statistical accounts.—The discussion on the effects of bearded rye upon the animal tissues was then continued, and Dr. De Michelis again explained and maintained his opinion that it increased the contractibility of the fibro-membranous vessels.

2. *Geological Section.*—The Cavaliere Rendu, of Chambery, read a paper exposing a new theory of the origin of erratic blocks, and of the causes why glaciers in the Alps were formerly much more extensive than they now are, and descended much lower into the valleys. Professors Sismonda and Pasini, with the Marchese Pareto, entered into a discussion on this subject.—The Rev. Canon Audisio, President of the Academy of the Superga, read a memoir, shewing that the Mosaic account of the creation might be reconciled with geological facts; and explaining, in eloquent terms, the advantage derived by true science from scientific meetings like the present.

3. *Physical, Chemical, and Mathematical Section.*—The engineer, Signor Bruschetti, laid before the Section a complete hydrographical account, with maps, &c., of the waters irrigating the Milanese.—Signor De la Rive explained the objects and results of his inquiries into the relation existing between electric and chemical forces, and exhibited a magnetico-electrical apparatus by Bonjol. He also exhibited the method of gilding objects by the voltaic pile.

4. *Agronomical and Technological Section.*—Signor Ferrari read a memoir 'On the Destruction of Mulberry-Trees.'—The Cavaliere Bonafous exhibited an ingenious machine for cutting the leaves of the mulberry, made by a poor mechanic of Grenoble.

5. *Botanical Section.*—A memoir, by Professor De Visiani, 'On several New Plants from Greece and Asia Minor,' was read; as also was a paper, by Signor Colla, 'On the Classification of the Varieties of the *Camelia Japonica.*'—Professor Balsamo read some considerations 'On the Elementary Organs of Plants,' and exhibited a valuable series of microscopic preparations exemplifying his theory.

6. *Zoological Section.*—Professor Civinnini, of Pisa, read a memoir 'On the Spinal Nerves

of the Shoulder in the Human Body, and in Animals of the Higher Orders.'—Dr. Rusconi communicated his method of operating upon very minute embryonic objects, such as the young of frogs and fishes, so as to obtain their skeletons. — Signor Michelin shewed the true distinctive characters of the *Turbinolia*, and described a new species of stony polypus, which he proposed to call after the name of the President of the Section (the Prince di Canino e Musignano).

September 24.

1. *Medical Section.*—Professor Lessona read a memoir 'On Glanders; on its Form, both in Man and the Horse:' he was of opinion that it was not contagious. M. Lecerf stated that recent experiments in France had proved the malady to be decidedly contagious.—Dr. Bellingeri announced his intention of repeating his experiments on the anterior and posterior radices of the spinal marrow, to the first of which he attributed the sense of touch, and to the latter that of movement. He requested that a commission might be named to aid him in coming to an opinion on this point. Professor Panizza hoped that members would be named for such a commission, and that, as much time would be required for the experiments, which ought to be most carefully made, that they should not report on their labours till next year's meeting.

2. *Geological Section.* — Professor Sismonda exhibited to the Section his new geological map of all the continental states of his Sardinian Majesty, and explained the method he had followed in making the principal divisions of formations, &c.—A conversation took place on the position of the anthracitical formations of the Alps.

3. *Physical, Chemical, and Mathematical Section.*—Professor Belli presented to the Section three apparatus of his own construction: one an hygrometer; another, a kind of electrometer, distinguishing between positive and negative electricity; the third, an instrument for presenting the fundamental facts on which the currents of the voltaic pile depended. Professors Cassiani, Botto, Mossotti, Configliachi, &c., explained their views of the origin of voltaic electricity.—A message was delivered from the President of the Congress, that in future the Chemical branch of this Section would form a separate division, and that Professor Configliachi would be its president.

4. *Agronomical and Technological Section.*—Signor Bonafous presented to the Section some plants of the *Polygonum tinctorium*, and specimens of the indigo extracted from it. Most of the members spoke strongly in favour of introducing the cultivation of this plant into Italy. —Signor Garneri read a paper 'On the Better Preparation of Potato Flour;' and Signor Ferrari one 'On the Best Means of Preparing Seed for the Ground by Solutions of Lime,' &c. —A note was read from M. de Caumont, inviting the members of the Section to next year's meeting of the Scientific Congress of France at Lyons.

5. *Botanical Section.* — Dr. Nardo read a memoir 'On the Structure and Habits of the *Stifftia Hildenbrandia*,' and exhibited specimens. Professor Decandolle and Dr. Moris made some observations. Dr. Moris exhibited some specimens from the herbals of Allioni and Bellardi of *Veronica Romana, Epilobium hirsutum*, and *Sedum hirsutum*; he also exhibited a specimen of the *Sedum glanduliferum* of Guss. —Dr. Biasaletto read a paper 'On the Fecula contained in the Cellular Tissue of the Stalk of *Convolvulus Batatas*;' and also exhibited drawings of the *Aurucaria imbricata*, from the gardens of the Cavaliere Ridolfi.

6. *Zoological Section.*— Signor Caffer communicated a notice 'On the Ichneumon called *Herpestes Mungo*,' found by him in Brazil; and of the water-hog, or *Hydrocerus Capibata*, found at Sariga di Azzara.—Dr. Bruno read a memoir 'On a New Species of Cat.'—Dr. Nardo presented specimens of silicious spongiacal animals from the Adriatic, and described two small species of fishes hitherto little known from the same sea.—The President mentioned his intention of compiling an elementary manual of ichthyology.

The first volume of the Transactions of the Congress is published; its title is as follows: "Atti della Prima Riunione degli Scienziati Italiani tenuta in Pisa, nel 1839: Pisa, tip. Nistri, 1840."

A deputation of the Royal Academy of Sciences of Turin has been admitted to present to the king a copy of the second volume of the second series of the Transactions of that body; the contents of which, divided into the two heads of *Memoirs of the Class of Physical and Mathematical Sciences*, and *Memoirs of the Class of Moral, Historical, and Philological Sciences*, are this year unusually interesting.

Sciarada.

Il *secondo* fugge celere
Fende l' aere, e va lunge:
Il *primier* lo segue stabile
E in un attimo lo giunge:
Ma però se al mio *primiero*
Necessario fia l' *intero*,
Si dimanda; senza questo
Lo può giunger così presto?

Answer to the last:—In-can-te-si-mo.

FINE ARTS.

NEW PUBLICATION.

Engravings after the Best Pictures of the Great Masters. Dedicated, by Command, to Her Majesty. Part I. London: Colnaghi and Puckle; and Ackermann and Co. Edinburgh: Hill.

THE work contains in this, the first part, three subjects—"The Taking Down from the Cross," from the pencil of Sir Peter Paul Rubens, and engraved by Henry Haig; "Landscape and Cattle," Claude Lorraine, engraved by William Forest; and "The Charge to Peter —'Feed my Sheep,'" by Raphael Sanzio, engraved by Alexander T. Aikman.

We consider this publication as coming in juxtaposition with one which has for some time been in the course of periodical appearance,—a selection from pictures exhibiting the talents of native art;* but we are not about to institute a comparison between the past and the present: we may, however, say that we have no fear of such comparison being made to the disadvantage of the latter. In the eye of candid criticism, we think they will mutually assist in leading the public taste to a knowledge of the principles of the fine arts, and of the advantages arising from such knowledge.

The execution of the engravings from the above masters is certainly creditable to the talents of those employed in the undertaking; but we were most struck with the luminous and brilliant effect produced in "Landscape and Cattle," by Claude, engraved by William Forest. "The Taking Down from the Cross" has the besetting sin of blackness to a degree of obscurity in some parts, making the effect more like that of Rembrandt than of Rubens. "The Charge to Peter" is in a clear and finished style of engraving, but which we never thought suitable to the character of the Cartoons.

The publication is accompanied by an account of the paintings, and remarks on their merits, &c. both in English and French.

* We have received the new number of "Findens' Royal Gallery," and shall notice it in our next.

THE DRAMA.

Adelphi.—We put our little favourite, which commenced its season on Monday, first on our dramatic notices this week, for it truly deserves it. The whole of the front of the house has been rebuilt, and many most judicious changes made in order to add to the public convenience. The best of these is the alteration of the gallery, which has been elevated, and otherwise much improved; and the ventilation of the theatre has thus been perfected. A new staircase to the boxes does away with any crowding on entering the theatre, and much has been done in the way of augmenting the light. At first sight, the beauty of the decorations is very striking; their softness in shading and colour very pleasing; and the new chandelier very beautiful. The return of Mrs. Yates to the stage was an event that was greeted as it should be, and she was evidently affected by the warmth of her welcome. Two new pieces were produced, and both with great success. The first is called *Robespierre; or, Two Days of the Revolution:* Mr. Yates playing the hero and his wife the heroine, and both acting in their best styles. The drama is divided into two epochs, one of joy, the other of fear, and ends with the downfall of the tyrant. *The Flip-Flap Footman* is as laughable as possible, and capitally acted by Mrs. Keeley, Mr. Wieland, and Mr. Nightingale, whose imitations are the most perfect we ever heard or saw. If our wishes and Mr. Yates's exertions deserve success, it is sure to be obtained; for our good wishes are most cordial, and Mr. Yates's exertions greater than we are accustomed to, even from him.

Covent Garden. — *Two in the Morning*, a scene between Mr. Charles Mathews and Mr. Keeley, has been introduced between the play and afterpiece here: it is impossible to notice it, for even while we write our sides are aching with laughter at the bare thoughts of it: it is decidedly the most merry little thing that has been produced for a very long time.

Haymarket. — Mr. Maywood has repeated the character of *Sir Pertinax M'Sycophant*, and has now firmly established himself with the public. It is long since we have enjoyed a fine old comedy so much as we have the *Man of the World*, as it is acted here. *My Aunt* has been resuscitated, and Mr. Wallack has resumed his original character in this amusing farce.

Princess's Theatre.—The internal arrangements being now perfected, the music is heard to great advantage; and the beauty of the theatre is an attraction to many to pay second and even third visits. The decorations are really of the most beautiful description; and, in fact, so dazzling with gold, and satin, and velvet, that we fear they would detract from the best scenery that could be painted. This remains to be proved, and, if report speak truth, it soon will be: for rumour says that Messrs. John and Morris Barnett have become the lessees, and are going to bring out operas in the most attractive style.

Olympic. — Miss J. Mordaunt, Miss M. Glover, Mr. Balls, and Mr. Horton, have been added to the company here; and the entertainments have been varied by the production of a capital interlude, called *My Grandmother's Estate*, which is very amusing. This, the

Three Brothers, and pieces of like stamp, afford a very pleasant evening's amusement.

VARIETIES.

British Association.—As an indication of the consideration in which the meeting at Glasgow was held, we may quote the following apology (the first leading paragraph) in "The Courier" of the 22d:—"To the exclusion, we are afraid, of matter of more general interest, we continue our report of the proceedings in this city of the British Association. In the exercise of a little self-denial, we must therefore refrain from any lengthened remarks on the more prominent topics of the day."

Entomology.—Mr. Conneil, of the High School, Glasgow, has made a collection of the insects found in Arran; a list of which is inserted in the "Statistical Account of the Parish of Kilbride." Amongst the beetles are the *Chrysomela fulgida* and *Ciciadela campestris*. Amongst the butterflies and moths are the *Cynthia cardui*, *Hipperchia blandina*, an Arran specimen of which first announced to entomologists the fact that it was a native of this country; *Hipperchia ligea*, *polydama*, *pamphilus*, *hyperanthus*, *janira*, and *semele*; *Polyommetus alsus* and *Alexis*; *Vanessa urtica*; *Gemra vinula*; *Anthrocera filipendulæ*, &c.

Embalming.—The family of the late Marshal Macdonald have sent for M. Gannal, for the purpose of having the body of the marshal embalmed by the process which we have lately noticed as having been introduced into this country by Mr. Smith.

LITERARY NOVELTIES.

LIST OF NEW BOOKS.

Low's Illustrations of the Breeds of the Domestic Animals of the British Isles, Part V. (Sheep, No. II.), 4to. 21*s.*—Howitt's Visits to Remarkable Places, 2d edition, 8vo. 21*s.*—Elements of the Practice of Physic, by D. Craigie, M.D. 2 vols. 8vo. 24.—Cemetery Interment, by G. Collison, Solicitor, f.cap, 7*s.*—Christian Literature: Evidences, with Prefaces, by the Rev. J. S. Memes, LL.D. royal 8vo, 14*s.*—A Birthday Present from a Father to his Son, f.cap, 2*s.* 6*d.*—Confidence in God, the only true Rest for the Soul, f.cap, 5*s.*—Sermons by the late R. P. Beachcroft, 8vo. 9*s.*—Tyas's Hand-Book: Commercial Law, 18mo. 2*s.*—The Christian System Vindicated, by the Rev. D. Moore, 12mo. 6*s.*—Dr. Paley's Natural Theology, 18mo. 2*s.* 6*d.*—Essay on the Productive Resources of India, by J. F. Royle, M.D. royal 8vo. 14*s.*—Pictorial Edition of Shakspere: Histories, Vol. II. royal 8vo. 17*s.* 6*d.*—The Recreation, 1841: a Gift-Book for Young Readers, f.cap, 5*s.*—Gray's Designs for Tombs and Cenotaphs, 10*s.* 6*d.*—The Old Oak Chest; or, a Book a Great Treasure, square, 3*s.* 6*d.*—Edinburgh Cabinet Library, Vol. XXVIII.: Iceland, Greenland, and Faroe Islands, f.cap, 5*s.*—History of the Jews, from the Taking of Jerusalem to the Present Time, 12mo. 4*s.*—The New Excitement, 1841, 18mo. 3*s.* 6*d.*—Rev. J. Cennick's Village Discourses, new edition, royal 18mo. 3*s.* 6*d.*—Dictionary of Greek and Roman Antiquities, Section I. 8vo. 10*s.*—Stewart's Practice of Conveyancing, Vol. III. 2d edition, royal 8vo. 22*s.*—Fisher's Drawing-Room Scrap-Book, 1841, 4to. 21*s.*—Fisher's Juvenile Scrap-Book, 1841, 8*s.*—The Church of God, by the Rev. J. D. Hull, f.cap, 4*s.*

METEOROLOGICAL JOURNAL, 1840.

October.	Thermometer.	Barometer.
Thursday .. 1	From 51 to 59	29·90 to 30·00
Friday 2	.... 47 .. 58	30·06 .. 30·11
Saturday .. 3	.... 37 .. 57	30·10 .. 30·03
Sunday 4	.... 45 .. 58	29·99 .. 30·01
Monday .. 5	.... 44 .. 55	30·00 .. 30·04
Tuesday .. 6	.... 37 .. 53	30·04 .. 30·03
Wednesday 7	.... 33 .. 53	30·01 .. 30·06

Wind, south-west on the 1st; north on the 2d and three following days; north-west on the 6th; and west on the 7th.

On the 1st, and morning of the 2d, cloudy; afternoon of the 2d, and following day, generally clear; a few drops of rain on the evening of the 3d; the 4th, generally clear, rain at times; the 5th, morning cloudy, with rain, otherwise clear; the 6th, and following day, generally clear.

Rain fallen, ·04 of an inch.

Edmonton. CHARLES HENRY ADAMS.

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